FEBRUARY 1972

WEEDS TREES and TURF

SPECIAL EMPHASIS GOLF COURSE CARE

IMPORTANT RENEWAL NOTICE
SEE PAGE 11

Through professional planning

Superintendents decide what a course needs to be healthy, look better and play better

like using ACTI-DIONE® in a Tees Greens Fairways program

Fungus diseases can bring disaster to a golf course. That's why professional superintendents decide every year to follow a complete disease control program.

Besides the direct damage caused by fungi, unchecked disease can ruin the investment made in fertilizer, weed control, water and management practices (verticutting, aerifying, mowing and the labor they require). This investment can range up to $80,000 a year and deserves the protection of a complete disease control program.

DISEASE CONTROL PROGRAMS PAY
Many superintendents have discovered Tees Greens Fairways programs of disease control pay their own way. They help eliminate the problems and costs which arise when turf is lost. They help eliminate golfer dissatisfaction. The increased play from growing numbers of golfers is too much of a challenge for anything less than healthy turf.

FOLLOW APPLICATION SCHEDULE
Although the level of control on fairways is not so critical as that required on greens, prevention of disease is always less expensive than cure. Start your fairway spray program in the spring as soon as possible after the first mowing. Continue on a scheduled basis—usually an interval of 21 to 30 days. Acti-dione turf fungicides can eradicate many turf diseases, but you will save time, money and many headaches by establishing a program of prevention.

TRAINED TUCO PERSONNEL
Just a call will bring one of our highly trained and expert field representatives to help you in your program of scientific turf management. He can help with more than just fungus diseases, too.

ACTI-DIONE ADVANTAGES
It's biodegradable and non-mercurial. It does not harm beneficial bacteria that are necessary for the breakdown of thatch and release of nitrogen and other nutrients. It is absorbed into plant cells through locally systemic action. It is water dispersible for uniform coverage when sprayed on the grass.

DISEASES CONTROLLED
Leafspot, Dollarspot, Melting-out, Fading-out, Going-out, Brown patch, Pink patch, Powdery mildew, Rust

Acti-dione TGF®

New formulation from TUCO. Easy-to-open 15-ounce zip-top package. Easy to use. Easy to handle. Easy to dispose of. Treats three average greens. For fairway use, check with your supplier.

Acti-dione® Thiram

Broad-spectrum, year-round disease control, including snow mold. Your supplier has complete information.

TUCO Division of The Upjohn Company, Kalamazoo, Michigan 49001

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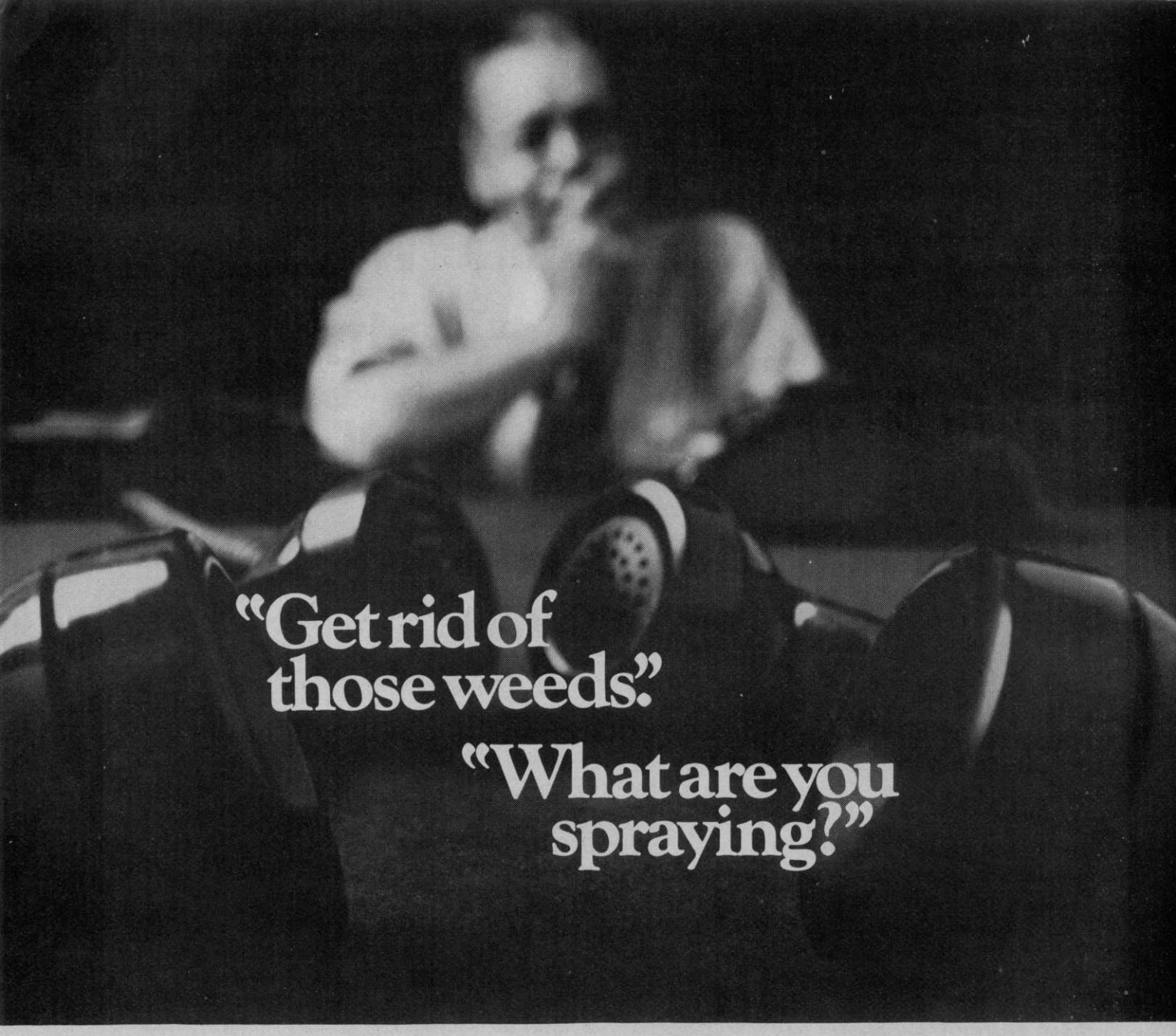

Geigy herbicides can satisfy both sides.

It's tough being the man in the middle when you're armed only with excuses.

Geigy herbicides give you something better. Answers.

Answers to all kinds of weed and vegetation management problems.

Answers that should satisfy both sides: Those concerned about stopping weed pollution, and those concerned about what you're spraying.

How? After Geigy herbicides do their job, nature breaks them down. This helps you enhance the environment without injuring it. Which makes your job easier. And more satisfying.

You've got AAtrex®, Princep®, Atratol® and Pramitol® to choose from. In wettable powder, emulsifiable, pelleted and granular forms. Each is suitable for various jobs and conditions. But all give long-term, effective performance. Singly or as the foundation for combinations of chemicals.

So if you'd like help in planning a vegetation management program that gives you answers, not excuses, please send this coupon to: The Industrial Weed Control Department, Geigy Agricultural Chemicals, Division of CIBA-GEIGY Corporation, Saw Mill River Road, Ardsley, New York 10502.

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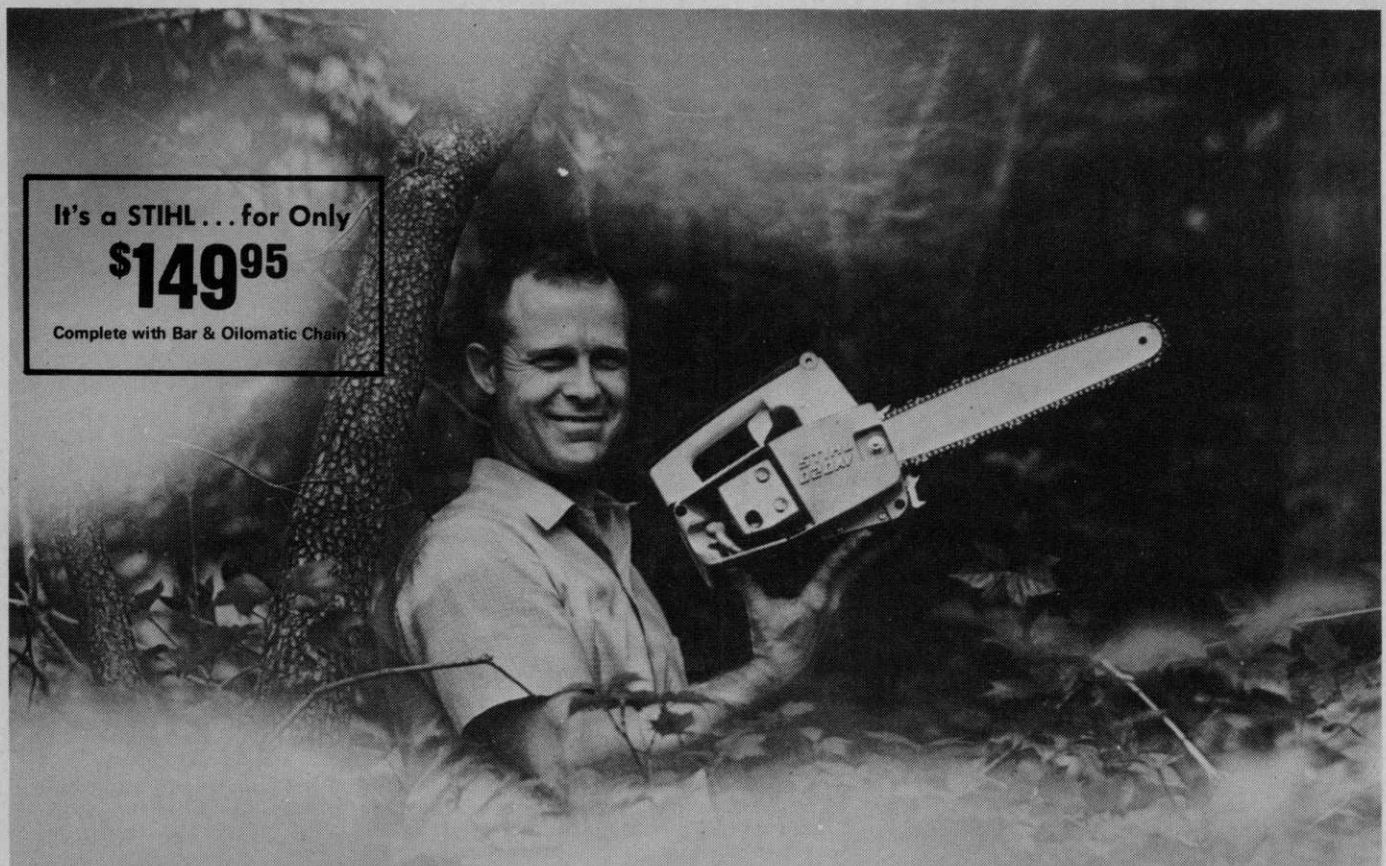

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STIHL 020 AV

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WEEDS TREES and TURF®

Volume 11, No. 2 February, 1972

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Turf Nutrition 14
Nitrogen, phosphorus and potassium have a great deal to do with the production of good turf. William E. Knoop, University of New Hampshire, analyzes these elements and discusses what can happen when they are out of correct proportion.

Programmed Turf Disease Control 16
Good disease control can extend the useful life of turf, provide a healthy playing surface and prevent bare spots. Robert T. Miller of the DuPont Company reports on a new turf disease program built around three effective fungicides.

Golf Course Development Outlook — 1972 18
Harry C. Eckhoff, facility development consultant for the National Golf Foundation presents the growth of this dynamic industry during the past 12 months.

In Search For Shade Tolerant Turf 19
Providing enough sunlight to support the growth of turfgrass under shade trees has been a problem with grounds managers. Here's a report on shade trials and new candidates.

Sulfur For Turfgrass 22
Turfgrass needs for potash seem to be closely associated with the quantity of nitrogen used. Dr. Fred V. Grau of Grasslyn, Inc. reports on the use of potassium sulfate as a source of potash. He suggests many advantages of the sulfur component for maintaining healthy turf.

Bullish On Baron 25
New bluegrasses are creating much excitement among golf superintendents and at sod meetings. One new grass is Baron. Peter Loft and John Morrissey, Lofts Pedigreed Seed, Inc. present an in-depth report on this quality bluegrass.

Turf Pest Control And The Environment 28
Like disease, insect pests on turfgrass can be costly. Many turf areas in California are being treated with diazinon, a non-persistant insecticide.

Lab Seeks Solutions To Tree Problems 44
The Shade Tree and Ornamental Plants Lab in Delaware, Ohio, has been concerned with Dutch Elm Disease for many years. Now, with possible cures on the horizion, Dr. Charles L. Wilson, plant pathologist, reports on the work conducted by the lab.

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The Cover

Mowing equipment, fertilizer, turf protection chemicals, quality sod and management knowledge are important ingredients of the turf industry. The striking mowing equipment shown on the cover symbolizes this industry. Precision mowers perform a vital function in turfgrass care.

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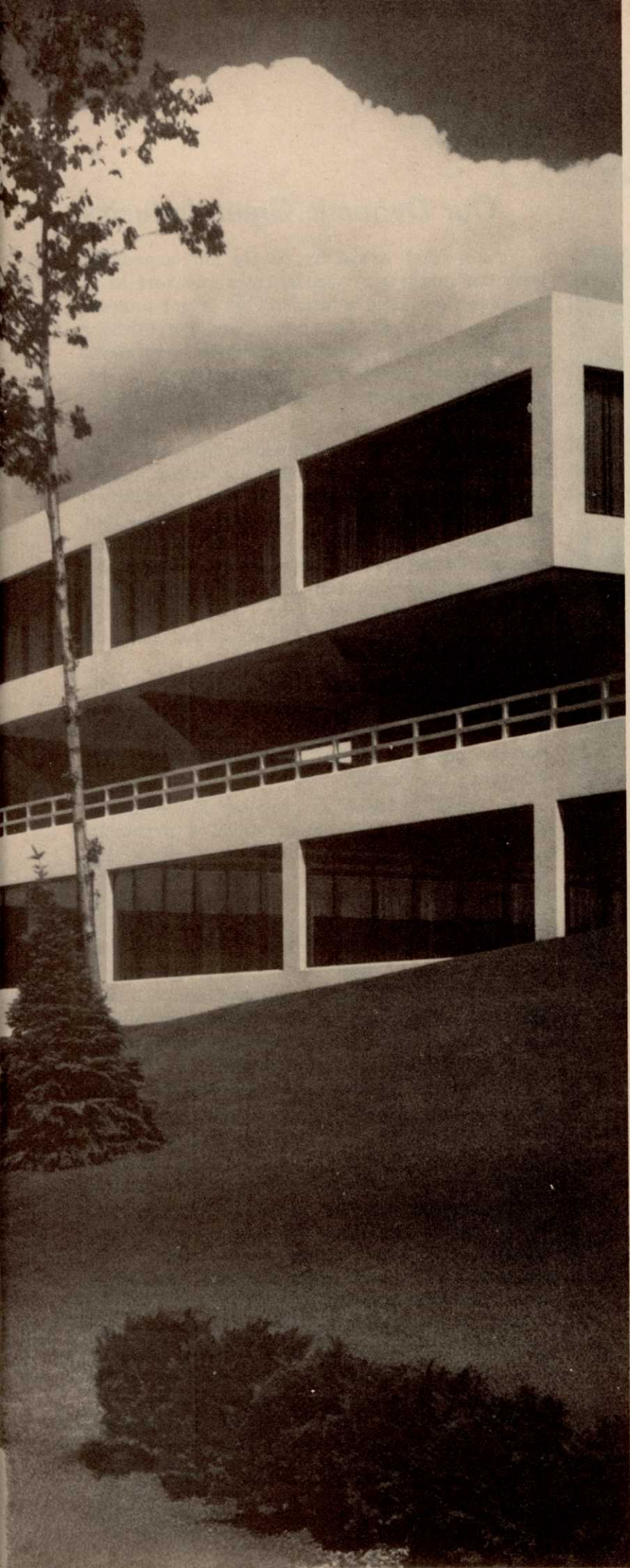

Now lower-cost, better, safer crabgrass control with Betasan®

Selective Herbicide

Betasan is the leader for sure crabgrass control with one early application on your turf. Safer to use than many herbicides, without any turf burn, Betasan at this year's new, low price saves you $8 to $10 per acre.

Betasan also controls goosegrass and barnyardgrass along with several annual broadleaf weeds. Remember too, that Betasan controls poa annua that germinates in late winter or spring.

Keep your grass areas clean of crabgrass, goosegrass and poa annua with Betasan at a new low cost. See your distributor now for turf-care products made with Betasan. Stauffer Chemical Company, Agricultural Division, Dept. HD, Westport, CT 06880.

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All Yours

FYLKING KENTUCKY BLUEGRASS

U.S. Plant Patent 2887

The ultimate in beautiful lawn turf when you insist on Fylking, the low-growing, ground-hugging, fine-textured grass. It produces an abundance of side shoots, and has a dense root system that strangles weeds and creates rich, green cushiony turf of unrivalled loveliness. More disease and drought resistant, Fylking has proven superior in years of international tests and actual use. It thrives cut at ¾ inch (even low as ½ inch) making backyard putting greens practical. Ask for 0217® Brand Fylking Kentucky bluegrass lawn seed or sod at your local wholesale seed or sod distributor.

Another fine product of Jacklin Seed Co., Inc.

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Editorial

Our Dynamic Green Industry

We are often asked by people not acquainted with the markets of weeds, trees and turf as to whether they have a future. This is not unusual because individuals, businesses and corporations regularly seek new ventures, business investments or additional outlets for advertising. And to this end we believe their questions about our trade are genuine.

To answer these questions we have relied on market surveys, studies, and other factors to give dimensions to the situation. We have also shown through the editorial pages of this magazine that our industry is dynamic, one of the fastest growing markets in the United States today. Witness, for example, the construction of a new shopping center, an apartment complex or a housing development that isn't concered with turfgrass, trees and appropriate landscaping.

Or, consider the near total dependence of people on agriculture's productivity at lunchtime in a busy city. These are also the ones who find relaxation and peace on the golf course or in a beautiful woods or shady park.

The Green Industry is growing. For example, Cleveland has over 100 linear miles of metropolitan parks surrounding the city and is still buying land. We see it in the attendance figures of the numerous meetings we cover. New products heretofore considered for other markets are breaking sales records — in our markets. Turfgrass conferences, industrial weed control meetings, strong university and Extension Service support and others are doing their part to educate and stimulate. Above all, we have noticed the enthusiam by those in the trade to be contagious.

The future of this industry rests with the people who comprise it. They are the ones who must carry the spark forward. And like the first three words of the U.S. Constitution, they are: "We the People. . . ." Our collective efforts to develop this trade, to create new jobs, to be bullish on business and to expand the Green Industry across the continent will serve a common need. Mankind cannot exist long without grass and trees. Our job is to promote this concept now.

Throughout this year we will endeavor to report new and different aspects of the Green Industry to you. We believe your use of this material will be the best public relations approach to those not acquainted with our trade. We must each become better ambassadors of the Green Industry. A united effort by us all will mean success.

Ransomes Hydraulic Power 5/7 Gang Mower is a reel time saver

The Ransomes Hydraulic 5/7 has a proven record of high work output. Why? Because it is totally **hydraulic** —totally! Every part of the cutting action is controlled from the tractor seat — raising and lowering of the units, forward and reverse drive of the reels. Hydraulically powered reels allow you to cut tougher grass—easily, saves turf damage.

Versatility takes priority in this machine—you can have 20 through to 75 cuts per yard—use any number of reels separately or collectively. You can even cut in the wet. You can climb and cut slopes that competitive machines cannot face.

As grass machinery engineers for over 150 years we know how to construct our machines.

Ransomes Hydraulic 5/7 is the greatest advance in design since the development of the gang mower.

- Reduced investment. Cuts semi-rough and fairway because of instant height-of-cut adjustments and operator choice of reel speed.
- Greater production; Spring, Summer or Fall. Wet or dry, you can go gang mowing with the Hydraulic Powered Gang
- Increased performance. Cuts up and down 'steep' slopes and banks with all seven units cutting; turns sharper eliminating overlap.
- Reduces labour. Cuts over edge of sand trap and around clubhouse lawns without leaving un-cut grass.
- Lower maintenance costs. Less wearing parts—no wheels, clutches, gears, instant back lapping from operator's seat ensures razor-sharp reels.
- Improved finish. Variable speed control of reels can produce greens finish on fairways . . . Less turf wear because of spring balanced cutting units. No wheels to cause drag or compaction.
- Super-tough impact resistant steel reels keep sharper—longer.
- Unit construction means quicker servicing time especially on reel and bearing assemblies.
- And finally—the complete cutting assembly can be easily removed from the tractor, leaving it free for other duties.

Apart from all this you have Ransomes name and reputation as Europe's largest grass machinery manufacturer.

To obtain full information of the Ransomes Hydraulic 5/7 contact your nearest Ransomes Distributor:

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Government News / Business

EPA To Release Pesticide Data The Environmental Protection Agency plan to make available to the public after January 17, 1972 data on the toxicity and efficacy of registered pesticide products. William D. Ruckelshaus, EPA Administrator, says that such information is in the public interest and should be under the Freedom of Information Act. No formulas or trade secrets will be disclosed. Action taken was in response to numerous requests from the public for information about the toxic qualities of pesticide products and their effectiveness.

Tax-Reducing Investment Credit Is Back The Tax Revenue Act of 1971 allows investment credit tax deductions much the same as a few years ago. That means substracting 7 percent of the value of "qualified investment" in new and, in smaller amounts, used depreciable property. Too detailed to report here. Check Section 38 entitled property of the act.

Atlas and ICI America Inc. Merger It was effective on New Year's Day. ICI America Inc. of Stamford, Conn., merged into Atlas Chemical Industries, Inc. of Wilmington, Del. The combined company, a wholly-owned subsidiary of Britain's Imperial Chemical Industries Limited, will be known as ICI America Inc. Headquarters will be in Delaware. Employment about 7,000 persons. Agricultural chemicals division will be centered in Stamford, Conn.

Extended Quarantine Area For Japanese Beetle Additional natural spread of Japanese beetle last year has extended the quarantine area to 21 previously unregulated counties in eight states. Counties in Georgia, Illinois, Indiana, Kentucky, Michigan, Ohio, South Carolina and Tennessee are affected.

Dalapon Tolerances Granted Food and Drug Administration has established residue tolerances for dalapon herbicide in meat, milk, eggs and poultry tissue, according to Dow Chemical Company. Tolerances complete conversion of all current registrations for dalapon, sold as Dowpon, from a no residue basis to a tolerance basis to meet new Federal requirements. Also opens the door for additional registrations for the product.

Driver Age Limit Reduced Bureau of Motor Carrier Safety of the Federal Highway Administration has reduced the minimum age limit from 21 to 18 for drivers operating any commercial vehicle weighing 10,000 pounds or less and who are otherwise qualified, without geographic location.

New Team Weeds Trees and Turf

James A. Sample joins the editorial staff of WEEDS TREES and TURF as editor. He succeeds Gene Ingalsbe who left The Harvest Publishing Company in 1971. The staff change was announced by Art Edwards, editorial director of WEEDS TREES and TURF and PEST CONTROL magazines.

In making the announcement, Edwards, who edited the magazine during its infancy, said that circulation has grown from 9,000 in 1967 to more than 33,000 today. WTT now serves the non-crop and industrial weed control business, nurserymen, tree service companies, grounds and maintenance contractors, Federal installations, contract and aerial applicators, university specialists and the entire commercial turfgrass market.

As editorial director, Edwards will continue to work closely with advertisers, association groups and industry members.

Sample was previously part of a two man agri-chemicals public relations team for E. I. Du Pont de

Nemours & Co., Inc., Wilmington, Del. For several years he has worked closely in communicating the role of crop protection chemicals to farmers, non-crop and industrial vegetation control industries, agricultural suppliers and the USDA.

He has written numerous articles and produced films, radio and television presentations on agri-chemicals as they relate to food production and vegetation control. He brings a wealth of experience in the fields of journalism and agricultural to WTT.

The new editor is 31, and has a wife, Anita, and two sons.

TIME TO RENEW: Your Renewal Card Is Bound In Above

We need your okay to continue sending you WEEDS TREES and TURF magazine on a *free* basis. In fact, we must have it.

We—and other publishers—have been somewhat remiss in the past in that we've sent your copy of the magazine whether or not you sent your card in. This can no longer be done.

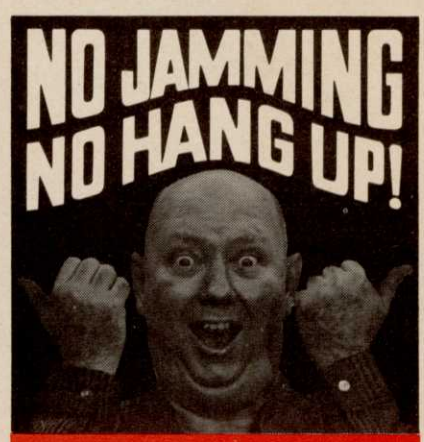
As you know, subscriptions are free to bonafide members of the industry. You qualify. But economics has again reared its head and we must stabilize our circle of readers. We shall maintain the magazine circulation at 33,000—the number which constitutes the basis for our advertising rate. No additional magazines will be sent except at the published rate of $10 per year in the U. S. and Canada.

MAY WE HEAR FROM YOU—by way of the bound in card above? Simply tear it out—SIGN and check your answers. DO NOT LOSE YOUR FREE SUBSCRIPTION TO SOMEONE ELSE. We want your continued support and we need you on our list.

Thank you.

Art Edwards, Editorial Director

(This renewal notice is a requirement of our national auditing service to verify that you are a member of the industry and that you wish to receive the magazine).



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You get the trimming job done faster and easier with the Ackley Hydraulic Pruner . . . . .

It gives you full hydraulic power on both the cutting and retracting strokes on any type of hydraulic system. No more hang-ups when you bite into a tough limb that baffles old type spring return pruners. You have FULL POWER on the cutting stroke too with no spring resistance to overcome.

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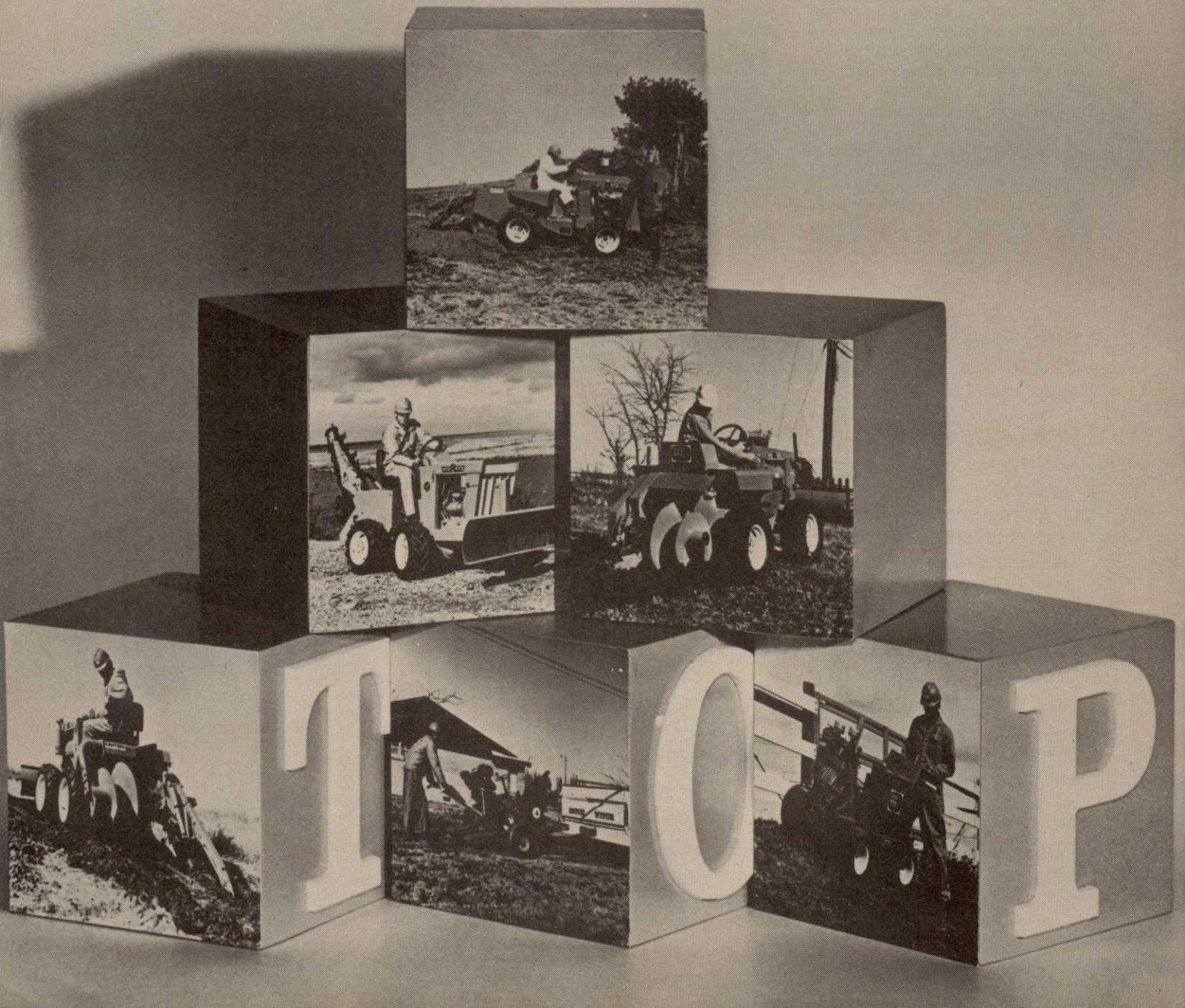


by starting at the TOP!

If excavation is in your job picture, then start at the top — with Ditch Witch superiority — and build a sound foundation beneath your underground fleet.

Ditch Witch is TOPS in its class — with more sales* of trenching vehicles than all of the competition put together!

Ditch Witch is TOPS, too, in **T**echnical design, **O**perational superiority, **P**roduct development and **S**ervice-after-the-sale. Think about it a moment — those are the areas that count most when *you're* on the firing line!

And the Ditch Witch "building block" concept of modular digging allows you to match your requirements exactly with the right horsepower and the right machine. Start with the 7-HP C series and add capability as the job demands it . . . or start with the mighty R65 and build an entire digging fleet with Ditch Witch modular attachments.

Whatever your own particular needs, you'll get the same TOP performance from America's TOP producer of trenching vehicles.

DITCH WITCH

*U.S. Dept. of Commerce, Bureau of Census, 50.5 per cent of 1970 sales (1971 sales figures not yet available).

TRENCHING VEHICLES FROM 7-65 HP . . .
MODULAR ATTACHMENTS FOR EIGHT SEPARATE DIGGING FUNCTIONS

Charles Machine Works, Inc. P.O. Box 66 / Perry, Oklahoma 73077

Turf Nutrition

By WILLIAM E. KNOOP
Extension Turf Specialist
University of New Hampshire

THERE are at least 16 chemical elements considered essential for the growth of good turf. Most of these nutrients are required in such small amounts that a soil can normally supply them. Of these 16 or so essential nutrients, the three that are required in amounts usually exceeding the capability of the soil to fully supply are nitrogen, phosphorus and potassium. These major elements are supplied to the turf plant through timely applications of a complete fertilizer.

NITROGEN ranks first in importance for optimum turfgrass growth. The most noticeable effect of low nitrogen is a pale green color together with a reduced growth rate.

Nitrogen's effect on leaf color is related to its role as an essential part of the chlorophyll molecule — the green molecule that converts light energy to chemical energy or food for plant growth. When the nitrogen supply is low, there are fewer chlorophyll molecules in the leaf, and the leaf loses its dark green color. With the reduction of chlorophyll molecules the total food production in the turf plant is lower. The plant becomes weak and may even die.

Nitrogen may be supplied to the turf plant in any of four basic forms; nitrate, amonia, organic, and molecular nitrogen. Molecular nitrogen, or the nitrogen present in the air, cannot be used directly by the turf plant for growth but can be fixed or stored in the roots of plants such as legumes. When a legume dies, this nitrogen becomes available for use by other plants. But because legumes are not normally grown with turf grasses, this source of nitrogen is not important.

Nitrogen is absorbed by the turf plant roots in the nitrate, ammoniacal or the organic form. Of the three forms of nitrogen, ammonical has a greater relative availability for plant metabolism. But, fertilizer high in ammonia can burn turf easily. A given amount of ammonia nitrogen will produce more lush growth than the same amount of nitrate nitrogen. Because of ammonia's tendency to produce lush growth, it is not usually recommended as a fall fertilizer.

PHOSPHORUS, the second element contained in a complete fertilizer, is found in smallest amounts in the grass leaf. Phosphorus is involved in photosynthesis, enzyme systems and has a very important role as a carier of energy. It is said to stimulate root growth. If a plant is deficient in phosphorus, fertilization with phosphorus usually increases the yield of roots more than that of the above-ground parts.

Phosphorus is involved in translocation of food to the roots for storage. Therefore, if phosphorus is deficient, less food is translocated to the roots and the storage organs (roots) tend to be smaller.

Phosphorus, released in soluable form in soils from the weathering of phosphorus bearing minerals and from fertilizers, recombines primarily with the clay fraction of the soil. The phosphorus percentage of the soil usually increases as the clay content increases.

Soluble phosphate fertilizers react rapidly with soils so that most of the added phosphorus will not leach from the point of addition. The availability of phosphorus is strongly dependent on soil pH with an optimum availability at pH 6.0-6.5.

POTASSIUM is another essential element and is second only to nitrogen in the amount required for plant growth. Potassium is the most active of the essential plant nutrients. It is easily leached from the soil and may even be leached from plant leaves during a rain or during irrigation.

A potassium deficient plant is said to have a lower disease resistance. The plant is more susceptible to winter-kill and may be more susceptible to insect damage. Potassium deficient plants suffer high water loss, thus require more water than those not deficient in potassium.

When high amounts of nitrogen, relative to potassium, are supplied to a turf plant, the plant produces a lush succulent type of growth. This type of growth is easily winter-killed, more susceptible to insects and disease and requires more water to keep it alive. Even though this is a fast growth rate, it is not necessarily a desirable growth rate.

The adverse effect of a high nitrogen supply may be tempered by potassium when it is supplied in large enough quantities. This interaction betwen nitrogen and potassium is perhaps the most important interaction in turf nutrition. The

(continued on page 37)

Table I. Percent Nutrients Found in Tifgreen Bermudagrass Leaf Tissue

Figure	Treatment	%N	%P	%K	Dry Weight (grams)
1	Complete Nutrient Solution	2.80	0.19	1.17	32.70
2	No-N	1.50	0.24	1.60	1.77
3	No-P	2.70	0.05	1.80	13.47
4	No-K	3.17	0.32	0.38	3.77
5	No N-P-K	1.60	0.12	0.97	1.80

Golf course superintendents and other turf experts throughout the country rely on these outstanding Chemagro Blue Bullseye chemicals to keep their grass in first-class condition throughout the year:

®**DYRENE** 50% Wettable Powder turf fungicide provides outstanding protection against leaf spot, melting-out, copper spot, rust, *Sclerotinia* dollar spot, brown patch and snow mold. Will not clog or corrode spray equipment. No unsightly deposit. Will not stain fabric or shoes when dry.

®**DASANIT** nematicide provides fast contact and long-lasting residual control of nematodes. Merely apply with a granular applicator and drench the soil with water.

®**DYLOX** 80% Soluble Powder insecticide provides outstanding control of sod webworms. Three spray applications at monthly intervals are recommended.

®**BAYGON** 70% Wettable Powder insecticide provides economical, long-lasting control of certain destructive insects attacking turf. Sprays are easy to mix and apply.

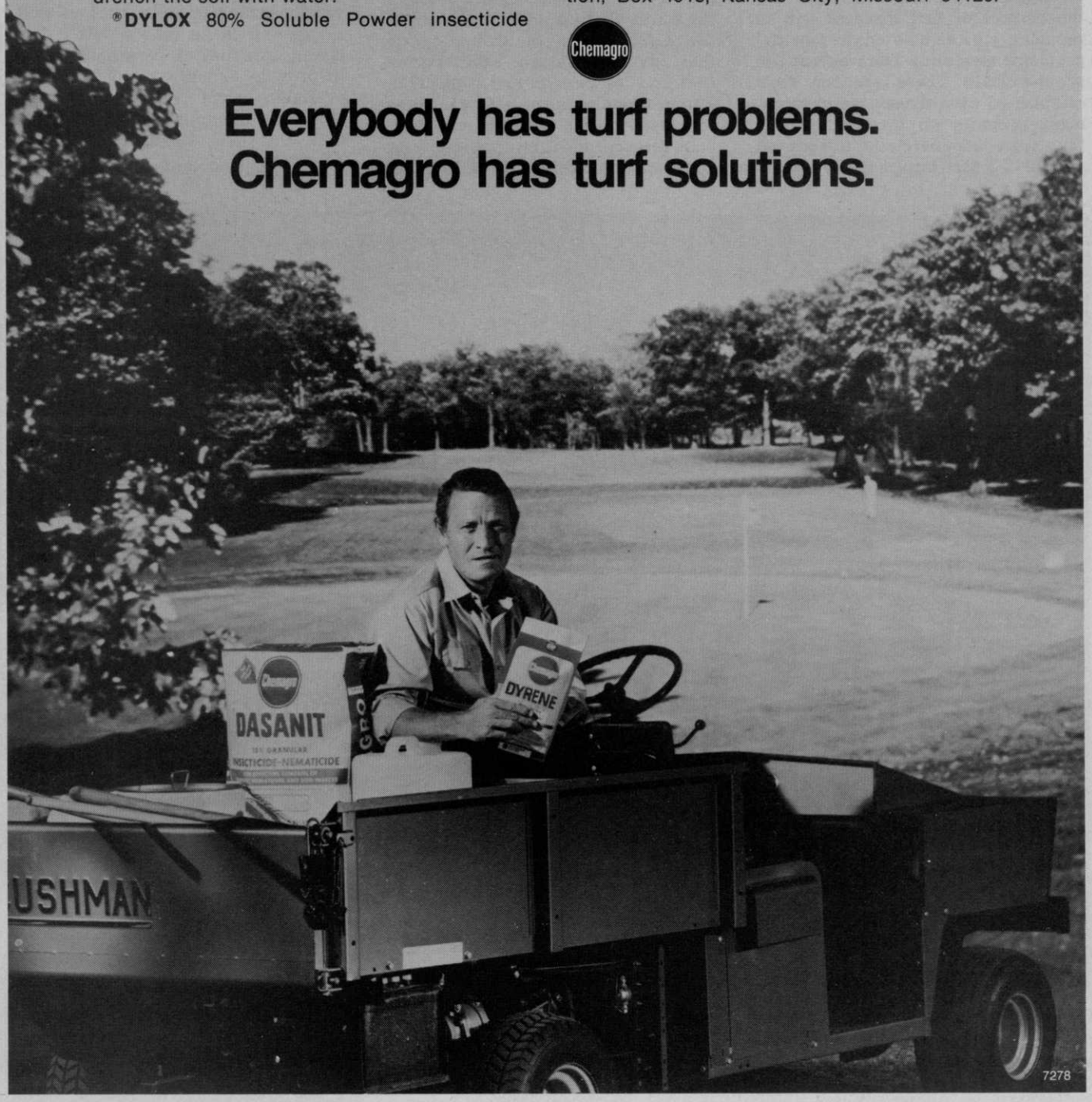
®**DEXON** 35% Wettable Powder fungicide is unsurpassed for long-lasting control of *Pythium*. Will not cause leaf burn when applied as directed. Compatible with other turf pesticides.

Contact your Chemagro supplier *now* for full information about these time-tested turf chemicals.

Chemagro, A Division of Baychem Corporation, Box 4913, Kansas City, Missouri 64120.

Chemagro

Everybody has turf problems. Chemagro has turf solutions.



Programmed Turf Disease Control

By ROBERT T. MILLER

Biochemicals Department

E. I. Du Pont de Nemours and Co.

Wilmington, Del.

Programming and proper timing in application of specific fungicides offer great potential for improving the control of turf diseases and in reducing possible environmental problems stemming from excess use of chemicals. These are the facts established by a three-year development program on three fungicides that were commercially introduced as a "1-2-3 turf program" in 1971.

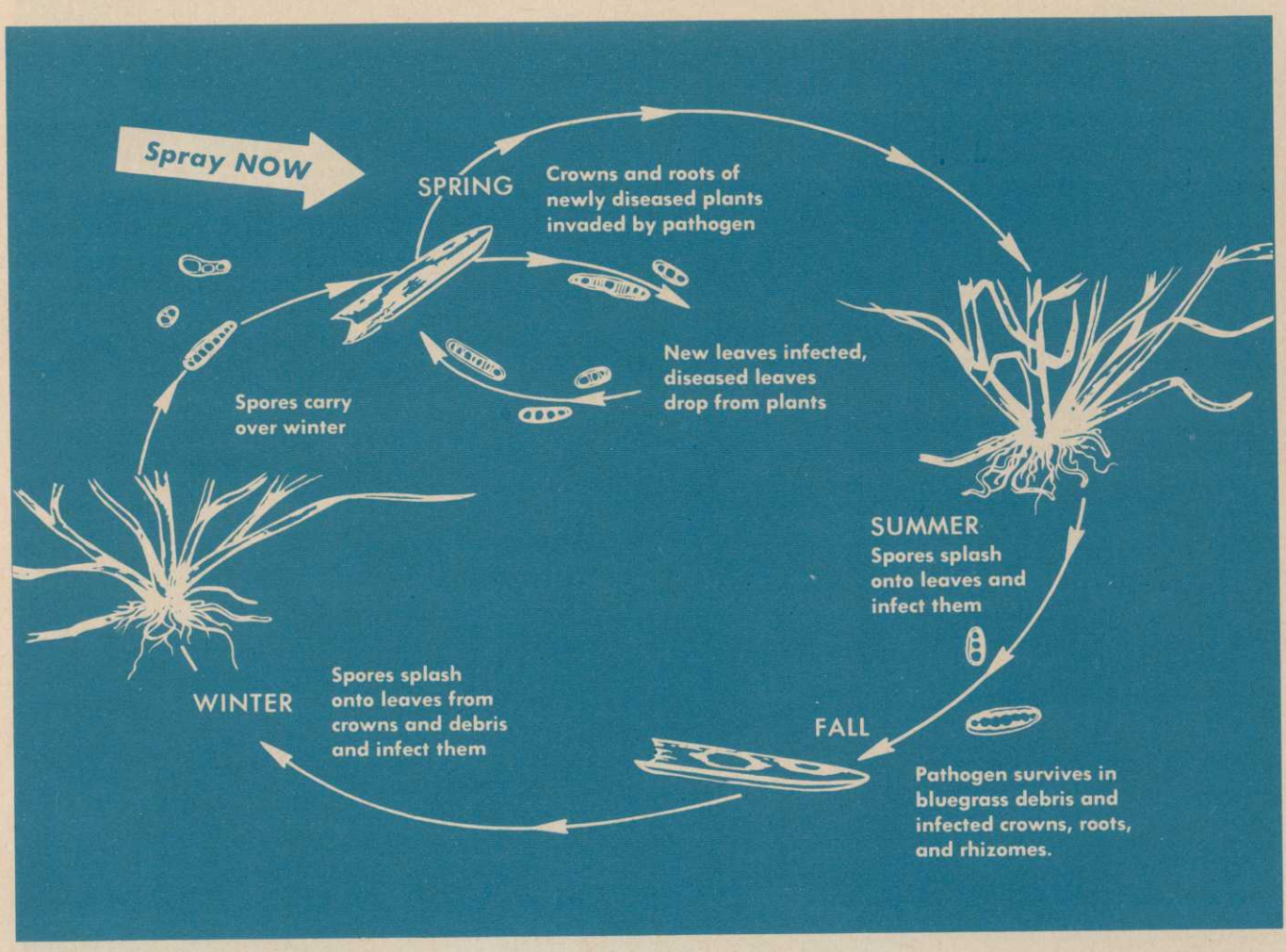
Now, with additional experience wherever cool season grasses are grown and in the bentgrass areas of the south, there is added evidence of the effectiveness of this program that involves Tersan LSR, Tersan 1991 and Tersan SP turf fungicides. The program requires action in three seasons — spring, summer and fall.

In essence, the first step calls for application of Tersan LSR in early spring, about the time of first or second cutting, to control leafspot (Helminthosporium spp.). Spraying at this time breaks the disease cycle of overwintered innoculum. Turf enters the spring growing period in a healthy condition. This decreases the chances of melting out or thinning out later on in the warmer weather of late spring or early summer.

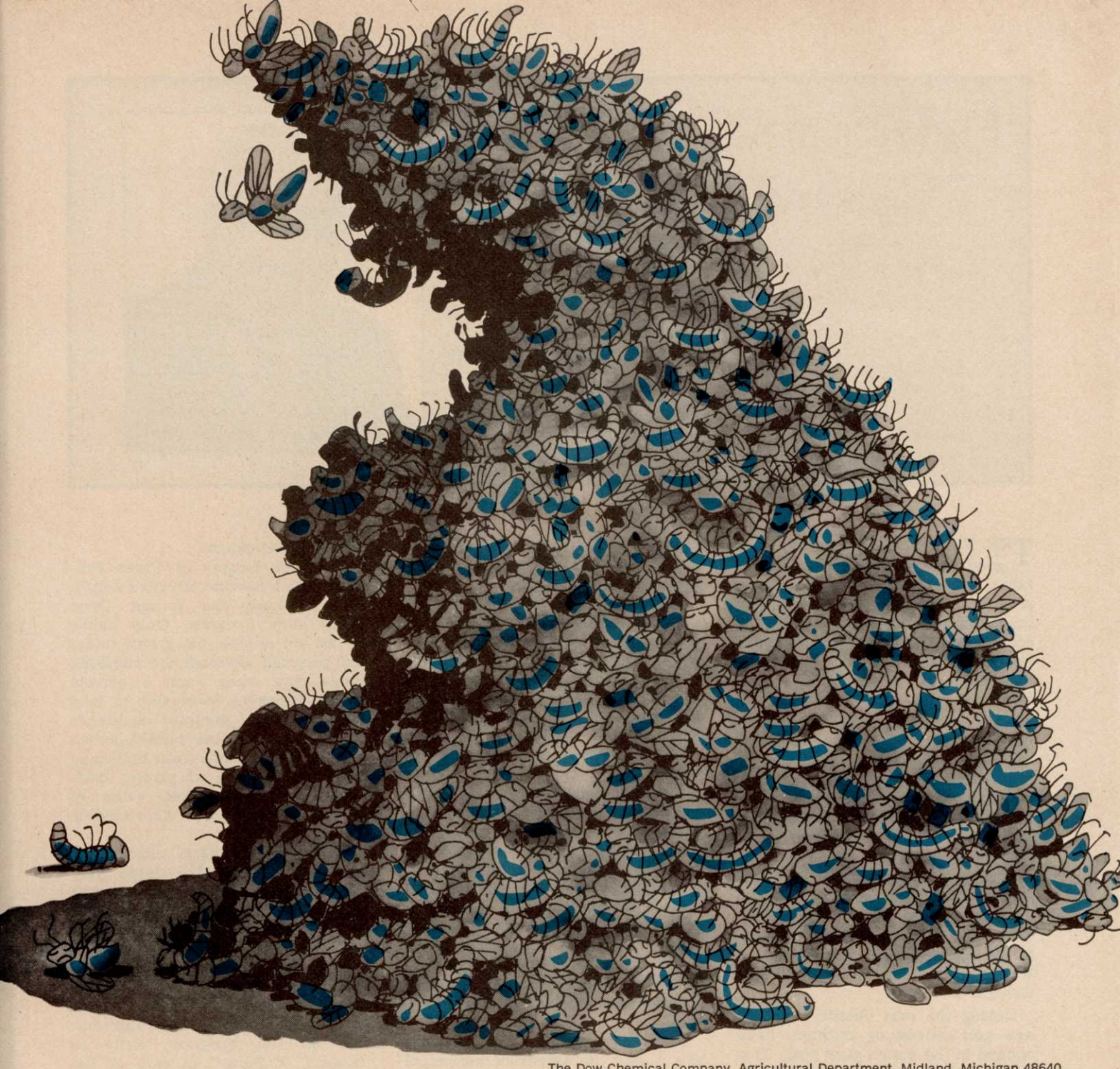
In addition, large brown patch (Rhizoctonia) and rust can be controlled with this fungicide.

A second step in the program calls for application of Tersan 1991 when dollar spot (Sclerotinia) first appears usually May or June, depending on the area. This application will prevent or eradicate dollar spot, as well as prevent large brown patch. The lasting qualities of Tersan 1991 help to provide longer control than that available with other previously available compounds; and in addition, this new fungicide will also

(continued on page 40)



Control Helminthosporium by spraying "Tersan" LSR early in the spring—at the beginning of the disease cycle. This inhibits the "melting-out" stage. Should symptoms appear during the season, use "Tersan" LSR to check disease spread. Spray at rate of 3-4 ozs. per 1000 sq. ft. at 7 to 10 day intervals. Reduce intervals during periods of severe disease conditions.



The Dow Chemical Company, Agricultural Department, Midland, Michigan 48640

Dursban insecticide gets you more bugs for your buck.

That means you'll not only wipe out chinch bugs and sod webworms, but more! You'll find a little Dursban® insecticide goes a long, long way. And Dursban won't leach, has excellent residual activity, even though it's degradable. It's safe, too–for all common turf grasses. Keep the holes out of your turf *and* out of your budget. Tell your contract applicator you want Dursban insecticide . . . the unsurvivable one.

DOW

For More Details Circle (139) on Reply Card

GOLF COURSE DEVELOPMENT OUTLOOK — 1972

By HARRY C. ECKHOFF
Facility Development Consultant
National Golf Foundation

THE NEW YEAR promises to be good for golf facility development. National Golf Foundation records reveal 290 new golf courses or additions to existing facilities in some stage of construction at year's end. Of these, 258 are regulation length and 32 are par-3's or executive type.

New regulation length courses under construction total 174; additions to existing courses account for 84. For par-3's the figures are 28 and 4, respectively. NGF files also show another 517 regulation courses and 84 par-3 projects under consideration or in planning.

Michigan leads with 25 golf courses under construction followed by Florida with 17, Ohio 16, New York 14, Texas 13, Indiana 12, California, Pennsylvania, Tennessee and Wisconsin — 11 each, Iowa 10 and Georgia 9.

During the past decade over 300 new golf courses or additions have opened in the nation each year. This record was maintained in 1971 when 371 new facilities came into play. There were 228 new regulation length courses, 89 additions, 42 new par-3 or executive layouts and 12 additions opened during the year.

The leading states with new golf course openings in 1971 were Michigan 29, Florida 26, Texas and Wisconsin 18, New York 16, Pennsylvania 15, North Carolina and Ohio 14, California 13, Colorado and Illinois 12, Indiana and Washington 11, Kentucky 10 and South Carolina 9.

Of the 371 new course openings in 1971, 33% were private operations, 48% semi-private, 15% municipal and 4% miscellaneous (collegiate, industrial or military). About 35% were part of real estate or resort developments.

About 65% of the new courses opening for play in 1972 are expected to be semi-private or municipal operations. And probably 40% of these facilities will be associated with new planned communities, high rise apartment and condominium complexes, second home projects or recreation and resort areas.

The continued growth of semi-private and municipal courses is in keeping with the trend of recent years. Golf no longer belongs solely to a few; it is everyone's game.

Sixty new municipal golf courses opened throughout the nation in 1971. This is an increase of 43% over 1970. Thirty-five were regulation length; 12 were additions to existing courses; 9 were new par-3 or executive layouts and 4 were par-3 additions.

Many of these new golf facilities are a part of extensive municipal recreation and park complexes. In addition to a well designed golf course, they often include tennis courts (sometimes lighted for night play), swimming pools, artificial ice skating rinks, playground and picnic areas, a community center building, fishing, camping, hiking, nature study and sometimes ski areas.

This new look for municipal recreation complexes is being spurred by strengthened federal incentives currently in operation. Many municipalities are taking advantage of a state grant-in-aid program administered by the Bureau of Outdoor Recreation, U.S. Dept. of Interior, or the Legacy of Parks Program directed by the Dept. of Housing and Urban Development.

The new Legacy of Parks Program which became effective July 1, 1971, replaces the former Open Space Land Program. Only public bodies are eligible for grants under this program although the matching funds may come from a private source. However, ownership of land acquired with program assistance must remain in the public bodies. The matching grants from HUD may cover up to 50% of project costs based on fair market value of property acquired and other eligible project costs.

Among the projects eligible for matching grants are large city parks, regional parks and areawide recreational facilities. This includes development of swimming pools and areas devoted to picnicking, camping, hiking, fishing, hunting, nature study and skiing. It also includes land acquisition costs for sites of golf courses. For detailed information on this program, write to "Legacy of Parks" in care of the U.S. Dept. of Housing and Urban Development, Washington, D.C. 20410.

The Bureau of Outdoor Recreation (U.S. Dept. of Interior) makes grants from the Land and Water Conservation Fund to states and through them to political subdivisions and other units of states for planning, acquisition and development of public outdoor recreation areas and facilities including golf courses.

Prime importance is attached to projects in areas where concentrations of people live. Projects must be available for use by the general public. Development of basic rather

(continued on page 58)

Improve your maintenance game

With the right clubs, a golfer can cut strokes from his game. And add power to his swing.

With the right maintenance products, a caretaker can improve his performance, too.

Dolge makes everything you need to achieve the best results, outdoors and in. With less labor. At less cost.

For example: *Tote* can kill any weed it hits; is non-poisonous. *E.W.T.-Plus* is a selective weed-killer. *Penetrate* improves soil porosity. *Lake Dye* colors ponds blue. *Anti-Dessicant* protects turf from drought and snow damage. *Boost* detergent-degreaser cleans machinery. Dolge also supplies famous fungicides.

Whatever your grounds-and-clubhouse maintenance problems, call on Dolge, the *Complete* Caretaker.

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Westport, Conn. 06880 • (203) 227-9591

Outdoors & In—Dolge. The Complete Caretaker

6 Stroke-Savers from DOLGE

1 **TOTE** non-poisonous weed killer for use where no growth whatsoever is wanted. Kills annuals, biennials, perennials on parking lots, drives, walks, gutters, courts. Finishes roots, stops seeds, sterilizes soil. 40 gallons of Tote in 60 or more of water cover a whole acre.

2 **E.W.T.-PLUS** selective weed-killer finishes broad-leaved weeds—kills dandelions, plantain, mouse-eared chickweed, even poison ivy—does not harm good grasses. Amine formulation: non-volatile; does not "jump" to flower beds or shrubbery.

3 **PENETRATE** natural, organic soil improver. Works through compacted soil; lets air, water and nutrients go deeper. Promotes deeper, stronger root growth. Encourages vigorous, beautiful turf, shrubs, trees. Prevents soil erosion and puddling of surface water. Speeds germination of wanted vegetation.

4 **LAKE DYE** a safe, non-toxic blue water dye for lakes, ponds, water hazards. Colors to shade of blue you desire. Apply 2 pounds to the acre, 4 to 5 feet deep. Harmless to wild life—swans, ducks, geese, fish, frogs. Harmless to grass too. Compatible with fungicides, insecticides, turf chemicals.

5 **DOLGE ANTI-DESSICANT** protects turf grasses and broad leafed evergreens against drought and snow. Allows plants to breathe, yet prevents loss through water transpiration. Guards against summer scald and plant shock, too.

6 **BOOST** detergent-degreaser for machinery. Spray or mop it on mowers, tractors, carts; hose off: clean! In the clubhouse, Boost is a real handyman for extra-heavy cleaning jobs. Great on concrete floors.

Write for your free sample copy of CLEANUP, Dolge's indispensable Bi-Monthly source of product and service news about the industry.

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The Search For Shade Tolerant Turf

SHADE from trees can often become a problem in good turf management. Even though trees are a very necessary and desirable part of our ecological balance, they can cause some rather perplexing problems in turf management.

Most difficulties develop when grass plants under or near trees do not receive enough full sunlight to carry on adequate photosynthesis. Consequently, shaded turf often deteriorates, thins out and becomes unsightly and patchy.

In some instances, less that 5% of available sunlight is able to penetrate a canopy of trees. However, turf failure under trees is not always due to a reduction in light intensity. A deleterious shift also occurs in the spectral composition of light. Tree leaves filter out much of the blue and red portions of the spectrum—the segment most efficiently utilized by grass plants. This causes a reduction in photosynthesis and diminishes the ability of the plant to manufacture carbohydrates required to maintain normal growth. Leaves become smaller, less prolific and more succulent. Color fades due to the reduction in chlorophyll. Plants lose their ability to develop new tissue and do not spread and fill in open areas.

In fact, the entire micro-climate under trees is considerably altered. Dew remains on grass leaves longer and humidity is increased. These conditions, plus the softer growth of the leaves, provides an ideal climate for diseases to attack the grass plants. In addition, many roots of large trees can rob grass plants of valuable moisture.

Certain management steps can be taken which help maintain turfgrasses under trees. Regular pruning of tree limbs allows more direct sunlight to penetrate through and reach the soil. Additional fertilization and water will make it easier for grass to survive. Stagnant air at ground level will allow turf diseases to thrive. Therefore, any plants or shrubs that restrict adequate ventilation should be removed or pruned. Aerification of the soil will aid the plant in absorbing nutrients more easily and mowing the grass at a 2-inch to 3-inch height

(continued on page 36)

Above: Shade trials were conducted under this canopy of trees. Sod plugs were transplanted throughout the middle of the area. Left: This is Nugget. Note that it has thinned, but the stand is still good. Leaves have elongated somewhat over their appearance in full sunlight. Color is dark green.

TOTAL TURF CARE IS HERE!

Get a full course of protection against weeds and disease.

Dacthal®

Start your Total Turf Care this year with Dacthal W-75 herbicide. Or use the convenient 5 percent granular form if you like.

Dacthal gets the jump on most annual grasses and broadleaf weeds. This preemergence herbicide prevents weeds as they germinate. Crabgrass and *Poa annua* don't have a chance. Yet, Dacthal is a truly selective herbicide that will not affect established grass. It's even safe for new grass when used according to label directions.

Just one application in early spring will control weeds for a full season. In the case of *Poa annua,* another application in late summer keeps this late germinating pest out of sight.

Don't worry about residue build-up either. Dacthal degrades in one season; it's not persistent in the soil.

Dacamine®

For those areas where broadleaf weeds are a problem, use Dacamine Turf herbicide to sustain your Total Turf Care. Postemergent Dacamine kills dandelion, plantain, poison ivy and most other broadleaf weeds.

Dacamine is a special form of 2,4-D, non-volatile, yet very effective. It combines the weed-killing power of an ester with the safety of an amine. So Dacamine stays put—kills the weeds you spray it on but won't vaporize and damage valuable plants nearby.

Dacamine is an oil soluble concentrate. This allows it to penetrate waxy leaves and move all the way to the roots—killing the whole plant.

Daconil 2787®

Total Turf Care includes broad-spectrum disease control. Daconil 2787 is the one fungicide that solves most disease problems. Why use a group of fungicides to do what Daconil 2787 can do by itself?

Use Daconil 2787 to prevent or cure: Brown Patch, Copper Spot, Dollar Spot, Leaf Spot, Melting Out, Pink Snow Mold (in Washington and Oregon only) and more. Many leading golf courses use Daconil 2787 in their disease prevention program.

Daconil 2787 has performed well on over 25 grass species and varieties. Excellent turf tolerance allows you to use it even in hot, humid weather.

Just mix Daconil 2787 with water and spray. You don't need a surfactant. It's compatible with many commonly-used pesticides. Follow label directions for exact usage.

Daconate®

Round out your Total Turf Care with Daconate postemergence herbicide. Get those escape weeds that slipped by your preemerge. Daconate will effectively control crabgrass, chickweed, wood sorrel and other hard-to-kill weeds. It's economical, too.

Daconate is a ready-to-use arsonate liquid, pre-mixed with the right amount of surfactant for maximum coverage and control. Since it is an organic arsenic compound, it does not have the more toxic properties of inorganic arsenic compounds, such as calcium or lead arsenate. For best results, spray Daconate during warm weather when weeds are actively growing.

FREE!

Get this Total Turf Care dial to help you solve many turf problems. Just a twist of the wrist helps you identify a problem and select a treatment. Send the coupon today for your Total Turf Care dial. Always remember to follow the label directions when using any chemical.

Be Diamond Sure!

Agricultural Chemicals Division
Diamond Shamrock Chemical Company
300 Union Commerce Building
Cleveland, Ohio 44115

Gentlemen: Please send me_____ Total Turf Care dials.

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Diamond Shamrock Chemical Company
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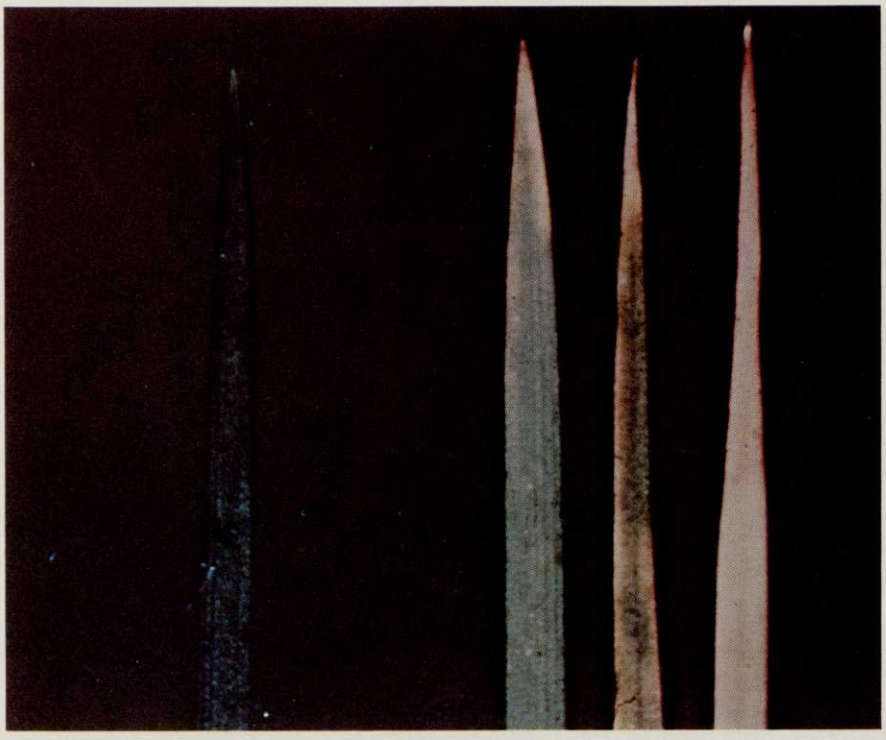
Sulfur for Turfgrass

By Dr. FRED V. GRAU
President, Grasslyn, Inc.
College Park, Md.



THE principal components of most turfgrass fertilizers are nitrogen phosphorus and potash, N-P-K. Over a period of time, the phosphorus content has been lowered gradually in deference to the tendency for this element to accumulate in the soil. Excess phosphorus is associated with an increase in *Poa annua* and with a nullifying effect on arsenic, which is a helpful chemical in reducing Poa populations.

On the other hand, the nitrogen content of mixed turfgrass fertilizers has been increased quite dramatically. Ureaforms have permitted this increase without increasing the chances of ugly burns. Fewer applications during a season are necessary due to the insolubility and the long-lasting effect of ureaform formulations.

During this period of developing fertilizers with higher nitrogen and lower phosphorus content, we have seen a growing recognition of the need for more potash in the mixes. The merits of adequate potash include greater winter hardiness, improved resistance to diseases, and imparting stiffness to grass blades, among others.

The need for potash seems to be closely associated with the quantity of nitrogen used. For maintenance, the quantity of potash needed usually is about one-half to two-thirds that of nitrogen. Where potash levels are low to very low, a 1:1 ratio may be used until balance is restored.

In developing a 16-4-12 fertilizer, for example, the general practice is to use potassium chloride, the less expensive form of potash, unless there have been specifications that require another potash carrier.

What are the other choices and why would they be specified? The first and most obvious alternate choice of a potash carrier would be potassium sulfate.

First, let us look at the nutrient content of the two materials.

	N-P-K-S
Potassium chloride	0-0-60-0
Potassium sulfate	0-0-53-18

Sulfur is the added ingredient.

The natural presence of sulfur in potassium sulfate makes this material a logical choice to supply potash

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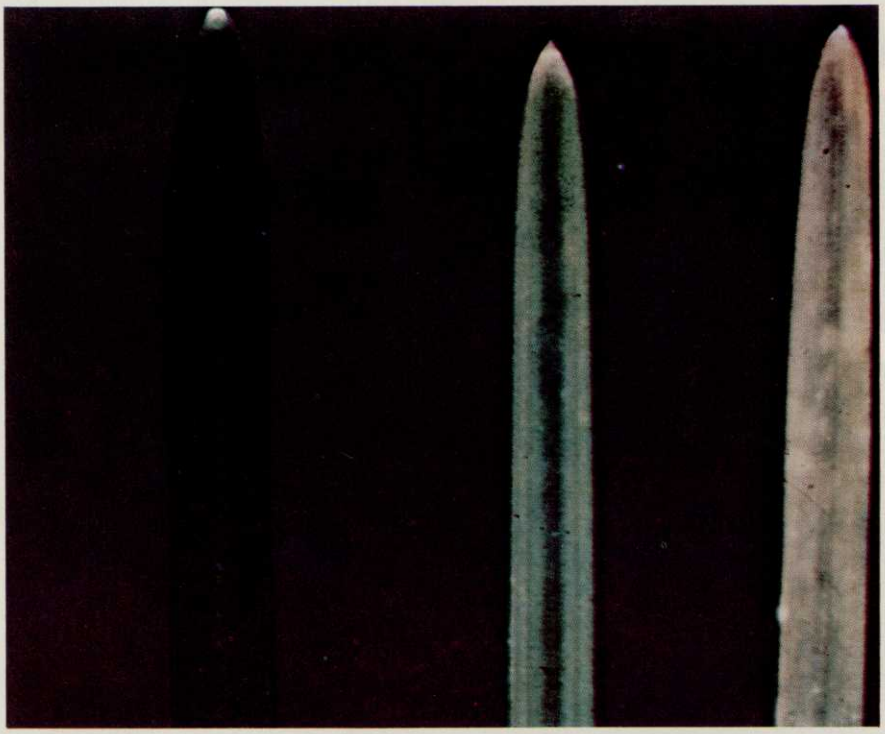


Right: Seaside bentgrass exhibiting a sulfur deficiency. Above: Sulfur deficiency in Merion Kentucky bluegrass.

HERCULES

TURF NOTES

SPRING, 1972

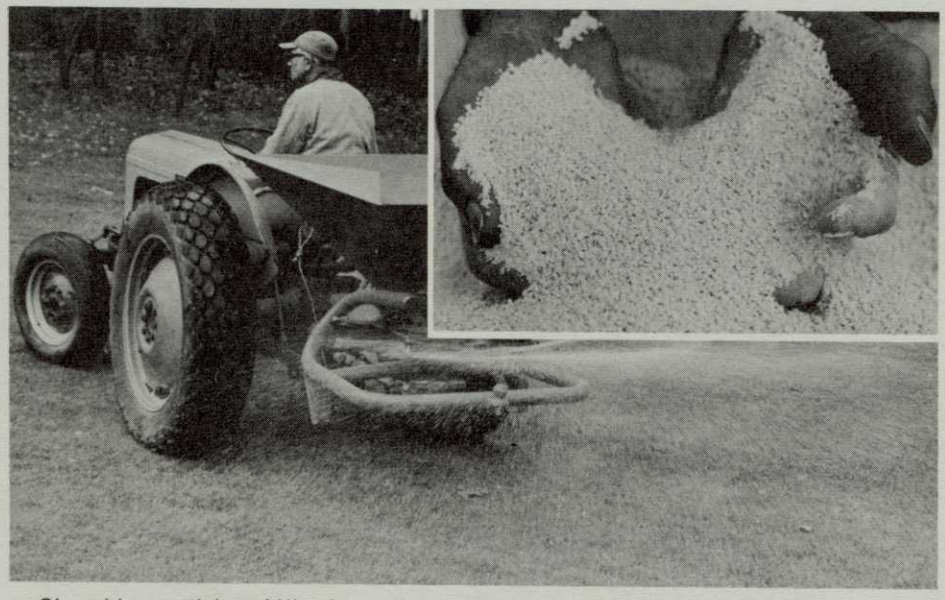
SPECIFY NITROGEN BY POUNDS OF N... NOT PRICE PER TON... ASK FOR **NITROFORM®** 38-0-0

Nitrogen derived from Nitroform® ureaform is one of today's best buys in any turf program. It doesn't matter how you look at it —pounds of available nitrogen per dollar, storage and handling costs, labor to apply, type of spreader, benefit of steady feeding, ease of use—Nitroform measures up.

Organic in behavior, Nitroform releases its nitrogen slowly through the action of soil organisms. Thus, it provides the slow-release, nonleaching, and nonburning benefits of the organics.

And Nitroform also overcomes the disadvantages of conventional organics. Low nitrogen organics are bulky to handle, and as much as half of the low nitrogen may never become available for plant growth. The odor is offensive to the applicator and the golfer, and it takes continuing applications to get enough nitrogen in the soil.

Produced under stringent manufacturing conditions, Nitroform guarantees 38% nitrogen and provides predictable performance. It is a nondusting chip for uniform coverage in all types of spreaders. Since it is clean and odorless, blue Nitroform is easy and pleasant to handle and store. Its blue color shows the applicator where he has been. And very important, as few as two annual applications can supply the nitrogen needed by fairways and tees.



Clean blue particles of Nitroform nitrogen are shown inside the spreader, and giving uniform coverage on a fairway.

Nitroform is available from leading turf specialty suppliers in the Hercules bag or in the supplier's own bag. JUST BE SURE TO ASK YOUR SUPPLIER FOR NITROFORM 38-0-0. It's the same dependable product whether in his bag or the Hercules bag.

When you need a balanced fertilizer, ask for the brand that carries a Blue Chip® fertilizer tag, to guarantee you at least 50% Nitroform nitrogen.

USE THIS COUPON to request the Nitroform program recommended for your area and the booklet that helps you compare the costs of organic nitrogen products.

• COMPLETE COUPON AND MAIL • NO POSTAGE REQUIRED •

☐ Please send Turf Notes Number 101-1 giving the Nitroform program for my area.

☐ Please send information on Azak for pre-emergent crabgrass control.

☐ Please send the booklet that shows how to compare the costs of Nitroform and conventional organics.

(PLEASE TYPE OR PRINT)

Name _____

Title _____

Company _____

Address _____

_____

Zip

POWDER BLUE™ is the same 38-0-0 long-lasting nitrogen, but in sprayable form. The ideal companion product for the nondusting chips, Powder Blue is for use on close-knit turf areas. The tiny particles rinse readily into dense turf and cannot be picked up by mowers or lawn sweepers.

Powder Blue can also be used in drop spreaders for dry application, where the finer particle is needed to penetrate turf like Bermuda. It contributes the same advantages as the chip of the blue Nitroform. It's the only organic nitrogen available for spray application, with high nitrogen content for fewer applications.

NITROFORM APPLICATION RATES

Requirements of Nitrogen per 1,000 sq. ft. per season	Pounds of Nitroform required Per M	Per A
2 lb.	5.0	230
4 lb.	10.5	465
6 lb.	15.8	700
8 lb.	21.0	930
10 lb.	26.5	1160
12 lb.	31.8	1390
14 lb.	37.0	1620
16 lb.	42.5	1850
18 lb.	47.8	2080
20 lb.	53.0	2310
22 lb.	58.5	2540
24 lb.	63.8	2770

AZAK® SEASON AHEAD!

Turf authorities all agree on one thing—the best time to eliminate crabgrass is pre-emerge. It's been proved that Azak® is a low-cost, effective pre-emergent crabgrass control. Azak doesn't leach out or evaporate so it can be applied anytime ahead of crabgrass germination. It remains effective throughout the germination period.

Azak is a wettable powder that disperses readily in water for use in conventional spray equipment. One 12½ pound bag will control crabgrass on one acre (43,560 square feet). It's economical, has no odor, is used on most established turf, extremely low in toxicity to warm-blooded animals and is compatible with most fertilizers and pesticides.

Note: Azak is not recommended for use on newly seeded turf—use only on established turf areas.

HOW DO YOU KEEP OUT CRABGRASS?

After you prevent crabgrass with Azak, the best way to keep it out is to adequately fertilize the desirable grasses. Crowd out crabgrass and weeds by feeding turf properly with Nitroform. It will thicken up and is a good way to ensure that you won't have crabgrass next season.

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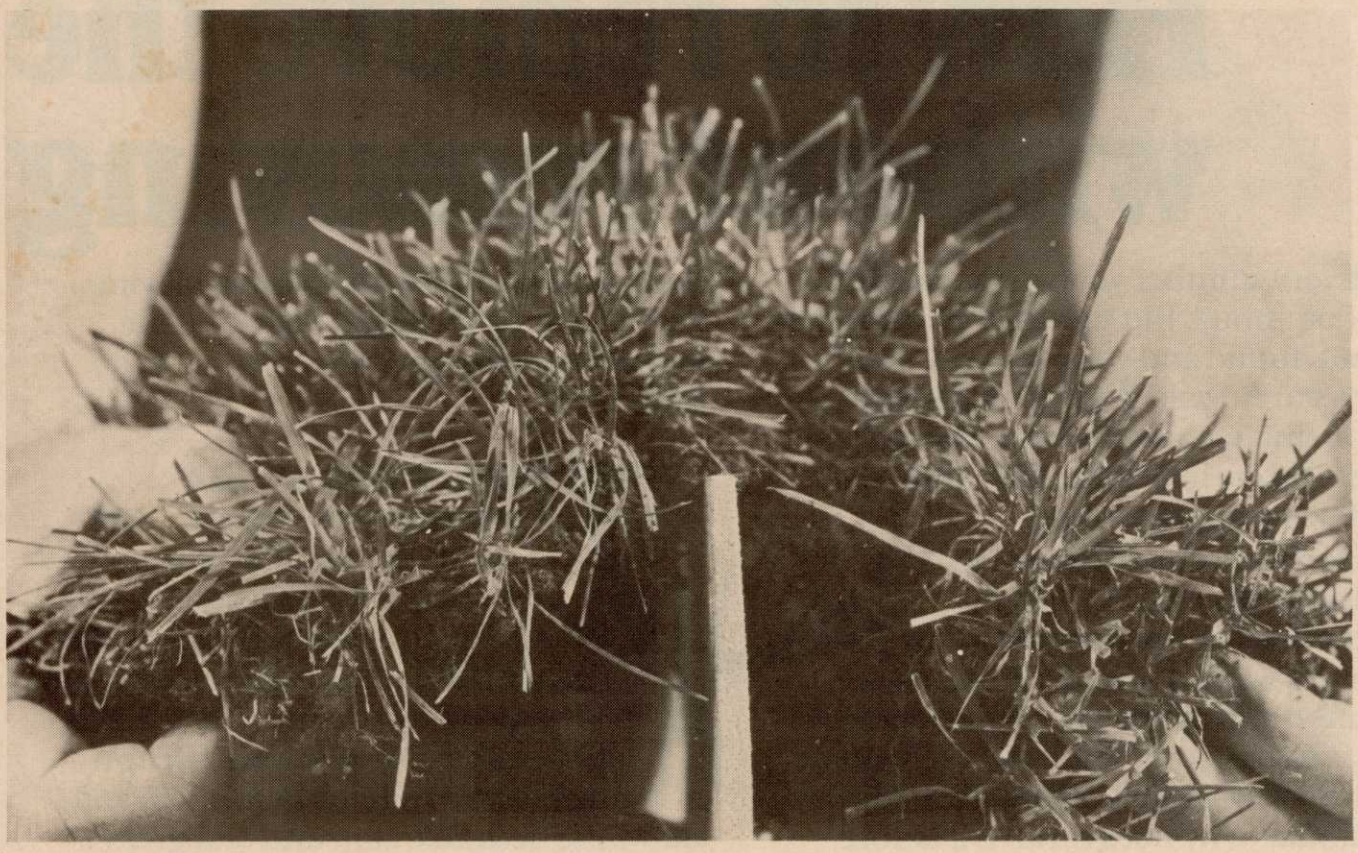


The rugged nature of young Baron sod.

BULLISH ON BARON

By PETER LOFT and
JOHN MORRISSEY
Lofts Pedigreed Seed, Inc.
Bound Brook, N.J.

A TIDAL wave of new bluegrasses for tailored turf is sweeping the country's golf courses, sports locations and prestigious lawns. There are many reasons why.

Sod growers are switching to seed that germinates fast, has good seedling vigor and exhibits early, robust rhizoming. On the other side of the table, golf superintendents, landscapers and commercial turf specialists are demanding more from seed varieties than ever before.

Performance and economy rate big among these people. Contrast heavy use of a turf area with maintenance and it is easy to see why superintendents want a turf grass that performs under a variety of growing conditions. Superintendents figure that to make an average to good return on investment, a turf area must undergo extensive use for an extended period of time. And this area must resist disease, stand up under close mowing and be hardy enough to overcome winterkill.

This is asking a lot of traditional bluegrass varieties, but the newer varieties can take many of these demands in stride.

One new bluegrass seed variety that exhibits these traits is Baron. It was developed in Arnhem, Holland — the parent clone originated with the Barenbrug turf breeders and checks out as a highly apomictic true-to-type pure line.

DISTINCTIVE FEATURES OF BARON BLUEGRASS

- ***Relatively broad blade foliage**
- ***Low growing with shortened sheaths**
- ***Longer growing season**
- ***Prolific rhizome production**
- ***Quick seed germination**
- ***Good seeding vigor**
- ***Certified clean seed, free of Poa annua and bentgrass**

Baron has consistently been rated superior in seed field trials both in the United States and Europe. Its appearance on the American turf scene has brought interest from sodmen, turf specialists, and superintendents alike. Why? The answer lies in the distinctive features developed in this grass.

Baron is a fast germinating seed that produces a relatively broad blade foliage. It is low growing with shortened sheaths, but exhibits excellent rhizome production. Sod farmers find it weaves into a tenaceous sod quickly. Many report that germination and root development exceeds other varieties by many days.

In germination tests of 100 seeds, 85 percent of the Baron seeds germinated in 14 days compared to only 19 percent for the Merion variety.

Reports on other aspects of this new bluegrass have been compiled from a number of university tests. Here are a few: Dr. Kenyon T.

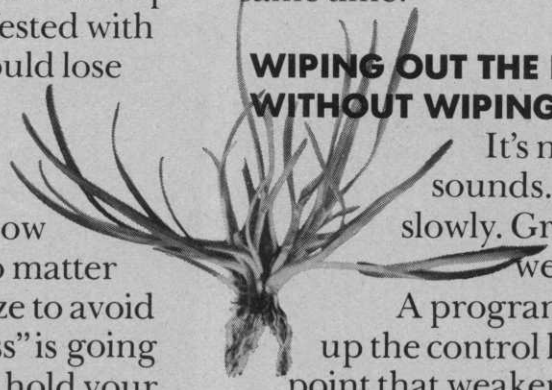
(continued on page 33)

How to remove the without removing

Every summer you've tried to hold your Poa annua. But suddenly it's unusually hot and humid and your fairways and greens start to wilt. Big brown patches crop up. You find your Poa annua infested with disease. You're in trouble. You could lose your fairways and greens.

Don't say it can't happen to you. It can. Because no matter how careful you are, no matter how much you water to avoid wilt, no matter how often and lightly you fertilize to avoid stress, one day your "failure grass" is going to fail. So why gamble and try to hold your Poa annua? Why not get rid of it before it fails?

How do you do it? How do you keep the course beautiful, the players playing, the Poa annua on the way out, and the desirable grasses on the way in, all at the same time?



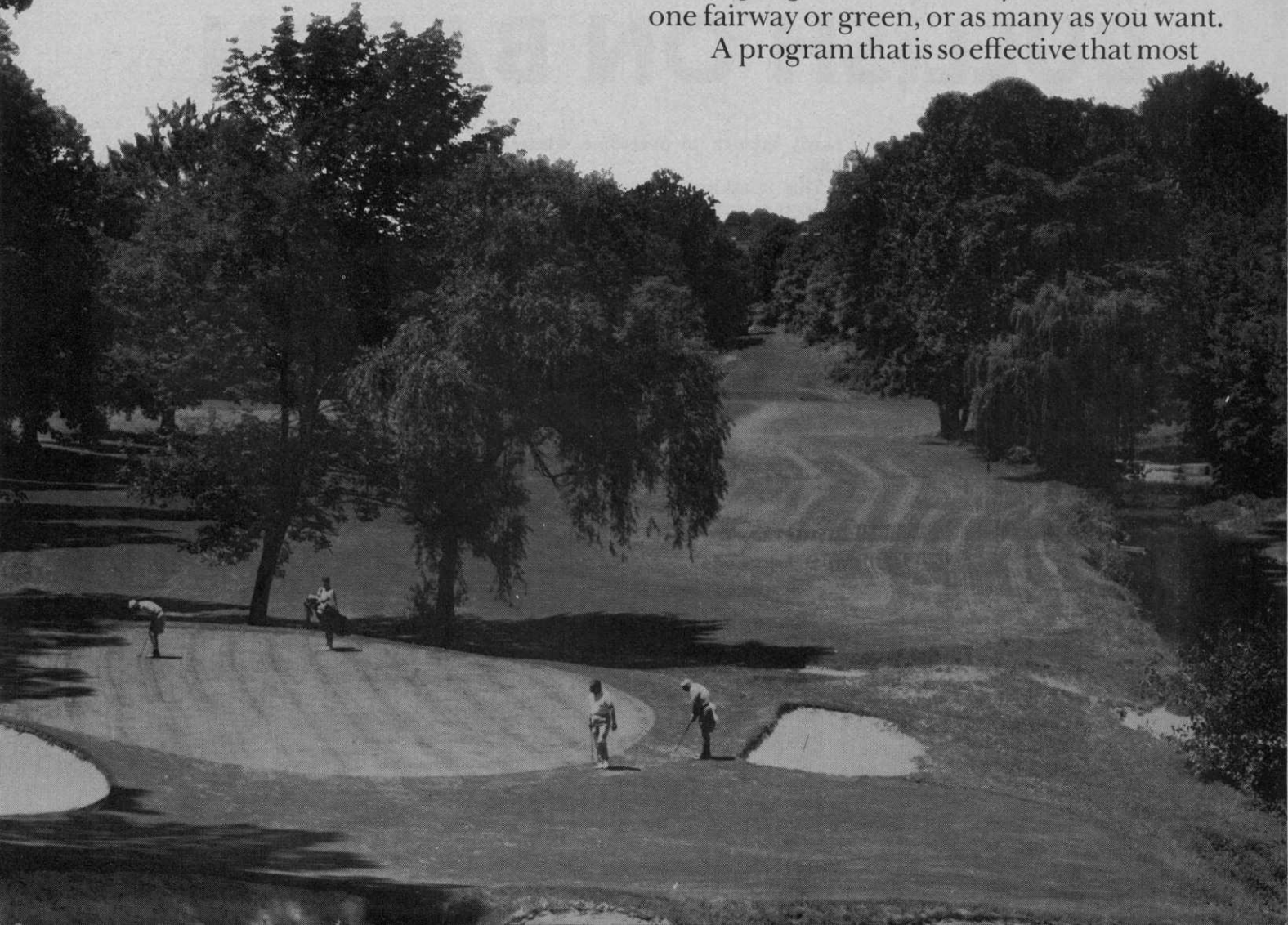
WIPING OUT THE POA ANNUA WITHOUT WIPING OUT THE COURSE

It's not as difficult as it sounds. Not if you do the job slowly. Gradually. With a simple, well thought out program.

A program that precisely builds up the control level in your soil to a point that weakens the Poa annua and allows the desirable bent and bluegrass to fill in.

A program that allows you to start with one fairway or green, or as many as you want.

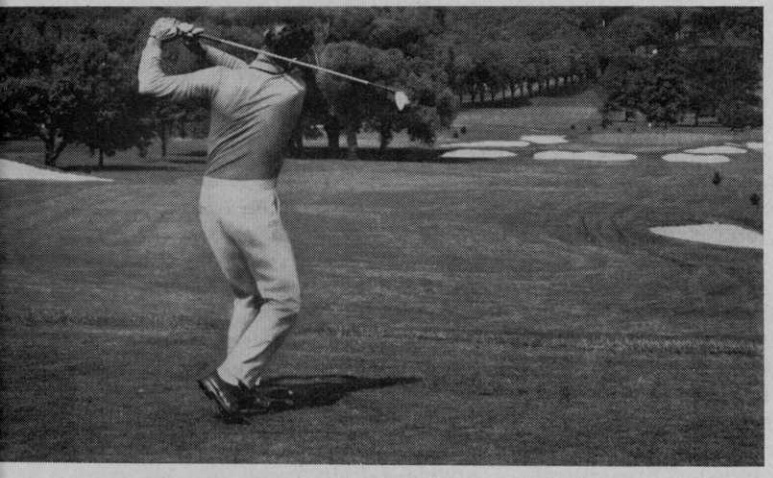
A program that is so effective that most



Poa annua the golfers

of your players won't even know that the course is being treated.

A program that even improves play by inhibiting the uneven, unsightly Poa annua seed heads.



A program that will work because it's already worked on many other courses.

A program that, in the final analysis, doesn't have to cost you an arm and a leg.

A SUCCESSFUL TESTED PROGRAM FOR THE GRADUAL REMOVAL OF POA ANNUA

This tested 6-point program is successfully eliminating the Poa annua at Greenbrier, National Cash Register Country Club and hundreds of other courses. It can do the same for you.

1. Drain low areas: Improve drainage of fairways with trenching and vertical slitting.
2. Correct soil acidity: Apply lime to greens or fairways if under a pH of 6.
3. Aerate, thatch or spike the grounds and eliminate phosphorous in your fertilizer program. Make room for new growth. Bring up some soil, get seed against soil. Overseed often.
4. Apply from 4 to 6 pounds of Chip-Cal Granular per 1,000 square feet on fairways, or 2 to 4 pounds on greens. Apply in the spring and fall. Vary application rates according to the percentage of Poa annua, available phosphate, pH and soil type.
5. Achieve Poa annua control: Light sandy soils low in phosphorus require less Chip-Cal to reach control.
6. Maintain control: Use 2 to 4 pounds of Chip-Cal per 1,000 square feet, either in the spring or fall. If Poa annua is dying too fast, use a liquid phosphate as a check valve.

Note: Chip-Cal Granular has been specially formulated for your Poa annua restriction program. It's granulated on a vermiculite base. Which helps give you a more uniform application and a more gradual release when you're building up your soil's control level. Chip-Cal also prevents crabgrass, goose grass, and controls soil insects and chickweed.

14 OTHER CHIPCO TURF PRODUCTS THAT TAKE CARE OF EVERYTHING FROM KNOTWEED TO SNOW MOLD

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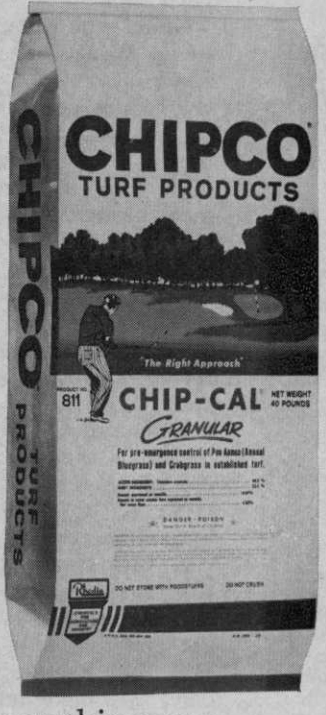

For example, in the spring, Chipco Turf Herbicide MCPP controls clover and knotweed on greens and fairways. And in the summer, Chipco Microgreen improves your turf's health and vigor. Used in the fall and winter, Chipco Rho-Mold will prevent unsightly and destructive snow mold.

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Address: Chipco Turf Products Mgr., Rhodia, Inc., Chipman Division, Dept. GS, Box 2009, New Brunswick, New Jersey, 08903.

Rhodia

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THE VIEW FROM CALIFORNIA

Turf Pest Control And The Environment

ROGER N. MUIR, pest control foreman at the University of California at Los Angeles, walks a tightrope between responsible turf-insect control and a growing barrage of questioning from students and others with a concern for the envioronment.

Muir, who is responsible for both indoor and outdoor insect control at UCLA, is charged with care of the 51 acres of campus turfgrass.

"We can't spray the grass without being questioned," says Muir. "People come up and want to know what we're applying. We're under great scrutiny and, frankly, I'm glad we are. Concern for the environment is healthy and the questioning is a good sign."

Muir, whose six-man staff works under Frank Schacht, UCLA's senior superintendent of grounds, falls into the "concerned" category himself.

"Handling insecticides is a serious business," he says. "Materials have to be chosen carefully, applications must be made only when necessary and then in a precise, careful manner."

In the past Muir has used chlorinated hydrocarbon insecticides (such as DDT) and materials that contained arsenic, strychnine or mercury. Then along came the carbamates and the organic phosphate materials that do a percise job, but don't persist in the environment. He switched to these. Currently his major insecticide is Diazinon.

A turf spraying program is one that requires periodic maintenance programmed against a known budget and available manpower. Muir says that he does not operate this way. "We have neither the staff nor the money for a preventive program," he explains. "When problems develop, we spray."

And problems do develop. Last July, a serious cutworm infestation hit the campus Sculpture Gardens.

"We made two applications of Diazinon, two weeks apart, and controlled it nicely," Muir reports. "The year before, we had bad cutworm problems in the same place. We tried four applications of chlordane, but still didn't get control.

"The cutworm works at, or below, the crown of the grass," he explains. "A cutworm attack results in a general browning out of Bermuda — and 90 percent of our grass is common Bermuda, the rest being hybrid Bermuda or dichondra."

Muir has been at UCLA ten years. Six years ago, he received permission to test his staff for cholinesterase levels, an indication of toxicity buildup in the blood. These blood tests are made annually and on new employees when they are hired. "We have never had a level that wasn't normal," Muir says. "Everyone on our staff is a licensed pest control operator. "We won't hire anyone who isn't."

Muir uses Diazinon 4E, an emulsifiable solution which can be used effectively indoors or outdoors. Turfgrass applications are made with a 50-gallon spray rig and a hand wand.

Another Southern Californian who has found the answer to turfgrass insect problems is Joe C. Judd, golf maintenance supervisor for the 12 golf courses of the City of Los Angeles. Judd cares for 144 bent-

(continued on page 62)

Rich Eichner, (L) superintendent at Lakeside Golf Course in North Hollywood, Calif., supervises an application of Diazinon 50W, a wettable powder insecticide. Manning the spray rig on Lakeside's 16th green is Eichner assistant Joe Palacios.

Now "zero-in" on gypsy moth and other tree defoliating worms!

HIGH POTENCY PERFORMANCE Thuricide® bacterial insecticide offers professional tree men a unique and effective weapon in their war against worms. Brings sure death to gypsy moth larvae, spring & fall cankerworm, fall webworm, oak moth larvae, tent caterpillar, red hump caterpillar. Packs more kill power (International Units of Potency) than any other insecticide of its type. Yet Thuricide does not affect man, birds, bees, pets or wildlife!

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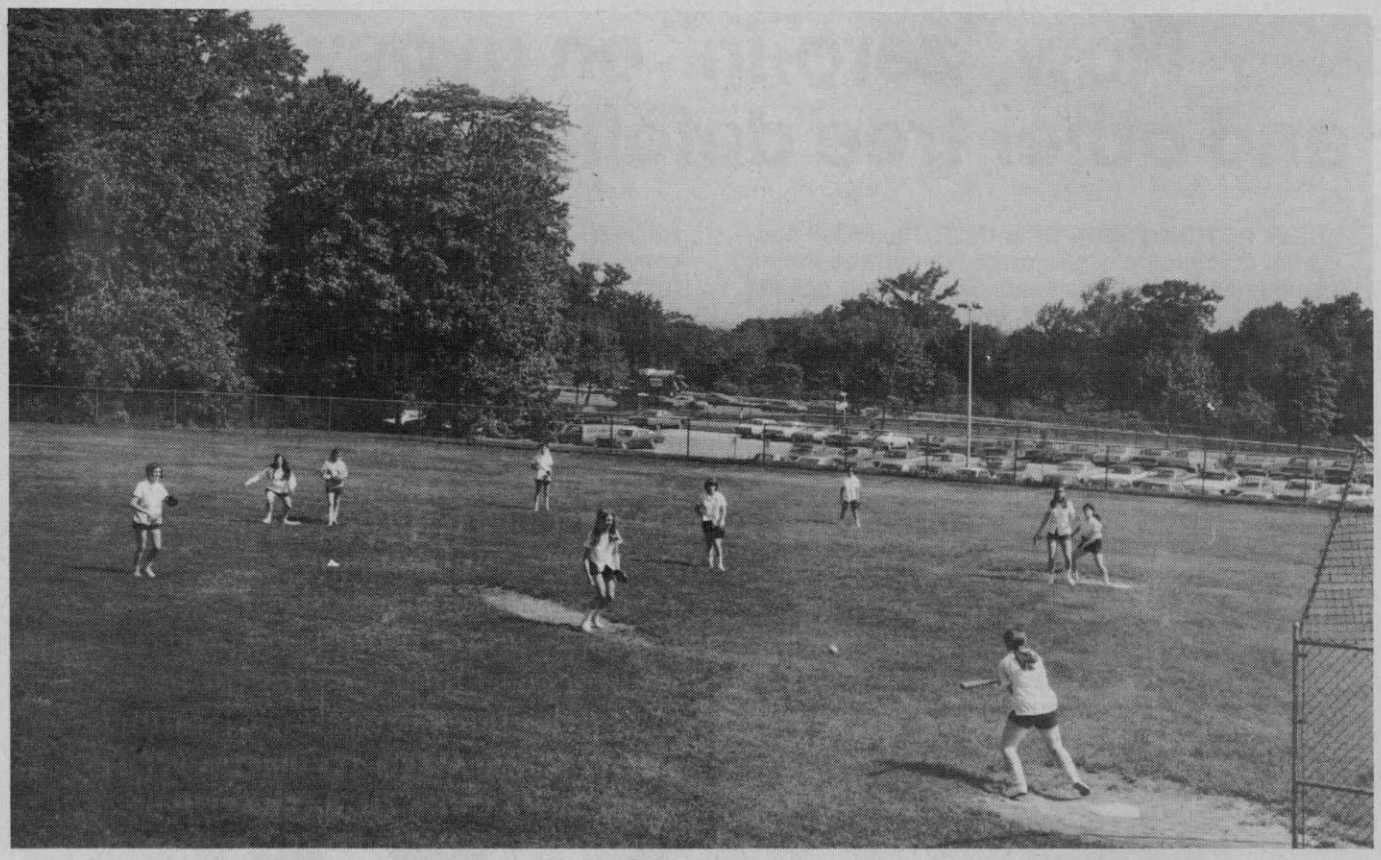


GREAT NECK Long Island Public School turf program (see (Large-Scale Turf Maintenance, Care and Cost, from WEEDS TREES and TURF, November, 1971) includes an intensive cultural turf program (1) Program mowing to cover all areas on the average of once a week in growing seasons; (2) Aerifying at least once a year, preferably in the fall; (3) Lime annually using a ton per acre, or as soil tests indicate; (4) Rainfall, averaging 40 inches per year, provides moisture except for newly seeded areas; (5) Fertilizing at least once a year, with an average of 3 lbs. of nitrogen per 1,000 sq. ft., and (6) Weed control only in special areas, since good grass stands prevent weed seeds from germinating.

Success of the fertilization program can be attributed to the fact that 75% of the nitrogen in a 20-6-4 fertilizer is Nitroform, a slow-release non-leaching organic. Continued survival of the thick turf indicates that it is getting adequate nourishment all year around, possible only with ureaform on a single application basis. During this 13-year long ureaform program, the turf has continually benefitted with a buildup of residual nitrogen.

Nursery Official Reports on Green Survival Concept

"The whole Green Survival idea is very rapidly becoming the major marketing approach for the nursery industry here in this country and in several other places around the world," says an official from the American Association of Nurserymen.

The Green Survival concept underscores the nursery industry's total involvement in the environmental situation, says Richard Hutton, public relations chairman for AAN. It stresses actions possible by any individual to protect and improve his environment, and emphasizes the ecological importance of the green growing plant life provided through the nursery industry.

The idea has been picked up and adapted by groups in several foreign countries. Nursery association leaders in England, Germany, and France, have requested marketing kits for their study and distribution. Industry people in those countries are already using the Green Survival approach in their public communications.

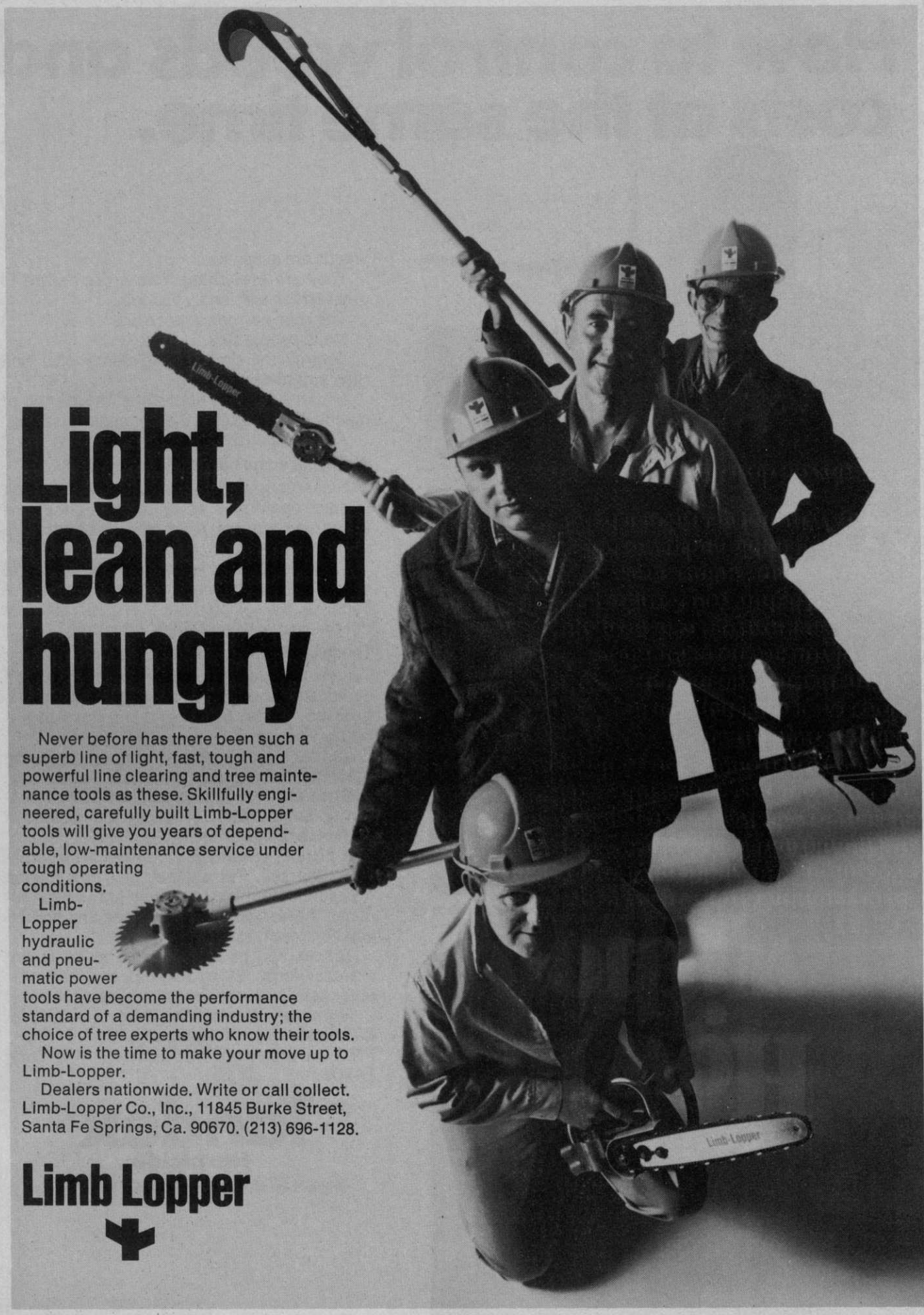
Across our own border in Canada, use of the Green Survival Program is becoming as widespread as in the U.S.A. Green Survival materials have been translated into the French language for use in the province of Quebec, and an outdoor advertising program has been introduced there to assist in spreading the message.

Here in this country, the Florida Cooperative Extension Service has employed the Green Survival concept in a 3-month series of television programs. A Milwaukee area Junior Chamber of Commerce featured a "Green Survival Week" during which they sold flowering crabapple trees as a fund-raising activity. A number of banking institutions have cooperated with their local nurseries in offering live plants as a new customer bonus—emphasizing the "Green Survival" idea in the projects.

A senior high school in Coral Gables, Florida is using the Green Survival publication as one of the textbooks for its course in Ecology. The instructor of the course has prepared a work-sheet for students based on material in that booklet.

"The case studies could go on and on," Hutton says. "The point is, this idea has captured the imagination of the public here in America and elsewhere because it has one answer for the environmental concerns which are on almost everyone's mind.

The Green Survival marketing kit is developed around a small publication prepared for public distribution. **"It Depends On You"** contains more than half a hundred simple steps any person can take to act on his interest in environmental improvement. While the booklet is a general guide to ecological betterment, more than half the points covered have a direct tie-in to the nursery industry's products and services.



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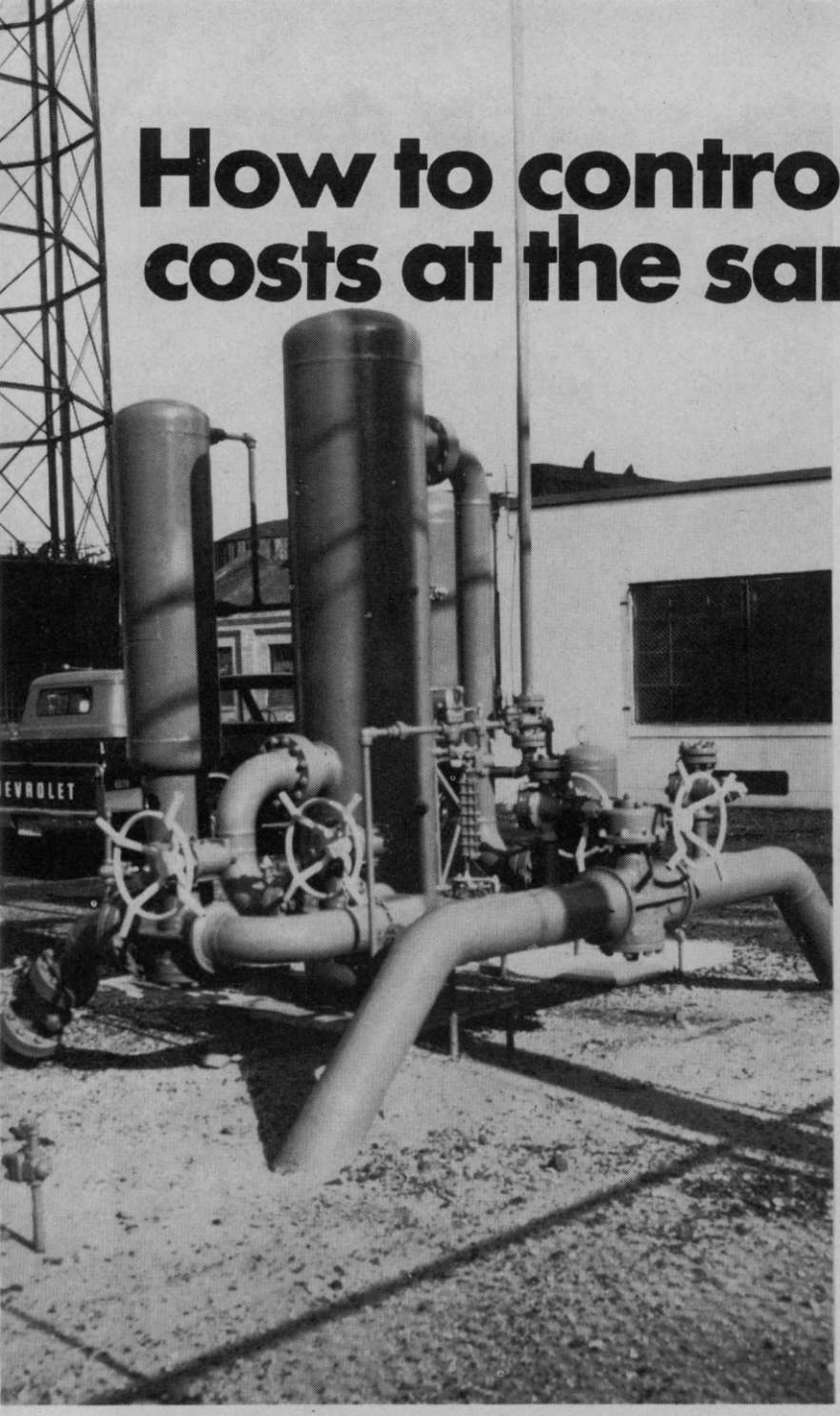

In industrial applications, as shown here, Tandex controls weeds along fence lines, parking areas, ditches, pipelines, sidings, storage areas, tank farms, and sign posts.

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Once applied, Tandex can last a whole season, or longer. Yet it's relatively non-hazardous to man, animals or fish.

A distinct advantage of Tandex is its stability in the soil. Put another way, this means it has minimum lateral movement—which reduces the danger to nearby trees and shrubs you *don't* want to lose.

Tandex can be sprayed or applied in dry granular form. It can also be combined with other herbicides for special control situations.

For more information, write to Industrial Chemicals Dept., Niagara Chemical Division, FMC Corporation, Middleport, New York 14105.

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BULLISH *(from page 25)*

Payne of Michigan State University says that in comparing 64 bluegrass varieties, Baron rated in the upper third (2.3 on a 1-10 scale). Merion, a standard of sod growers, rated only slightly lower at 2.5. One other commercial variety and a couple of experimental hybrids rated higher.

Dr. J. L. Eggens, Ontario Agricultural College, Guelph, summarized his findings in the **Turfgrass Variety Trials 1968-1970**. Over seventy varieties were evaluated for hardiness, color, density, texture, disease resistance, and vigor. Four replicates were made and all grasses were mowed at 1½ inches. Monthly ratings from April through November were made on a 0 lowest to 10 highest scale.

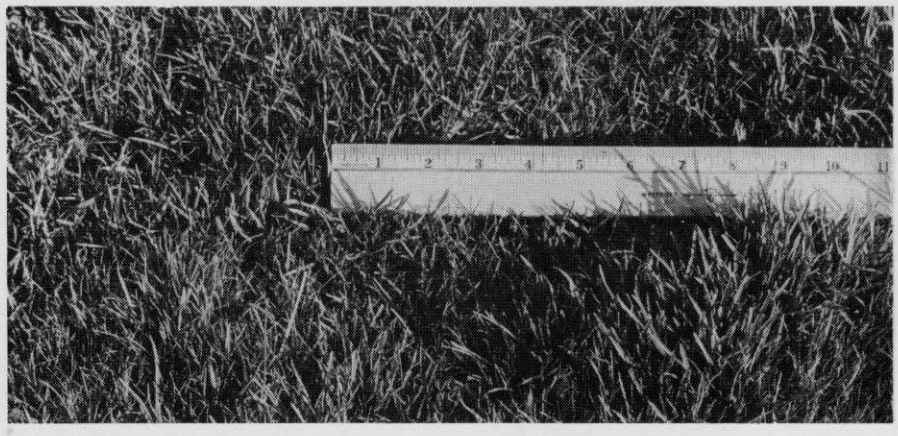
For the 1968 period, Baron averaged 7.1. The following year the average was 6.3. The average for all other leading bluegrass varieties was 5.3. Less than 15 percent of the trials scored as high as 6.0.

In another trial at the University of Rhode Island, Dr. C. R. Skogley reported that Baron plantings were considered to be an excellent new variety. Trials since summer of 1966 have consistently performed well. Skogley said that Baron resembles Merion in many respects but seems less subject to dollarspot and less demanding of fertilization. Stripe smut and leafspot incidence has been low.

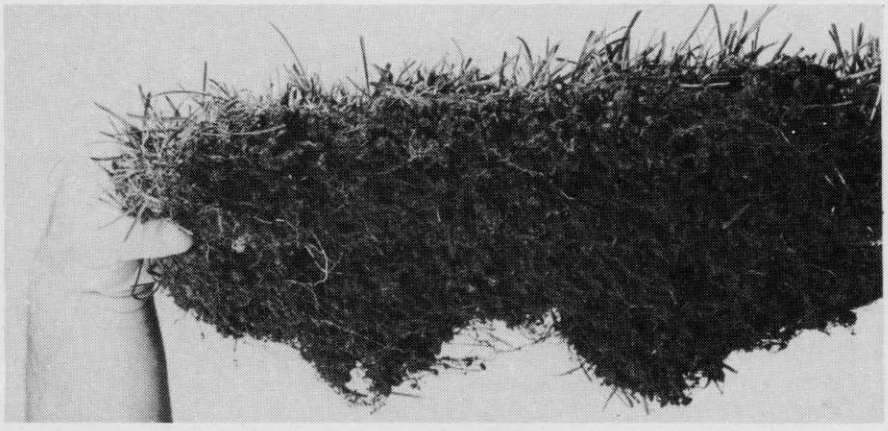
One reason for it's acceptance among superintendents is performance on the course. Baron grows slowly. This means fewer mowings. This bluegrass can be mowed as low as three-fourths inch without damage. There appears to be an interlocking of the sturdy grass blades to form a strong sod surface. On fairways and tees, golf balls are not buried.

Superintendents are now looking for turf varieties that hold color throughout a longer playing season. Baron has deep coloring and to a large degree retains much of this coloring during the winter season. Reports from Germany indicate that Baron greens up ahead of other leading varieties in the spring.

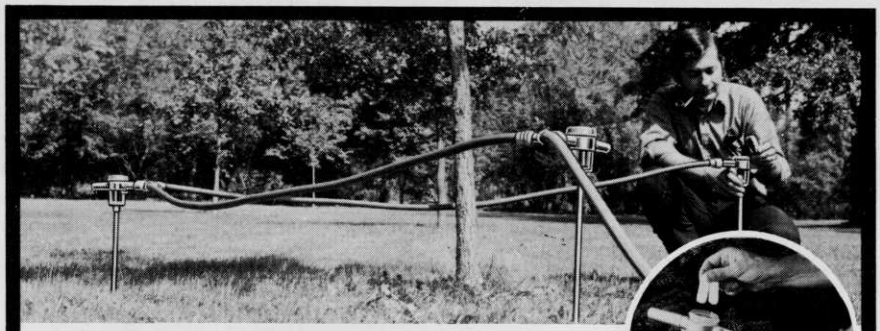
Currently, Baron has been granted a U.S. patent. Loft Seed Company, exclusive agent for Baron in this country, and Barenbrug intend to insure the market by all legal means that only blue tag certified seed free of *Poa annua* and bentgrass be sold. Indications are that there will be a fine, economical seed crop in the production year ahead.



Baron sod grows fast. This sod is only six weeks old from seeding.



Tough root-rhizome system of Baron sod only a few months after seeding.



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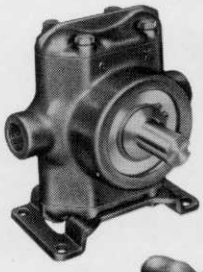

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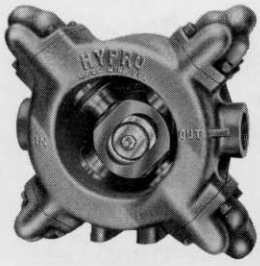

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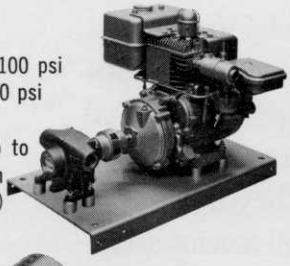

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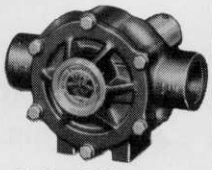

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SEARCH *(from page 19)*

will allow more leaf surface for the production of carbohydrates.

Red or Chewings Fescue are generally used to maintain turf under trees. Poa trivialis can be used with some success but is better adapted to moist conditions, such as the north side of buildings. Kentucky Bluegrass varieties are generally not considered to be tolerant to even moderate shade conditions.

When fescues are used in combination with bluegrasses to establish turf in shade, each kind of grass tends to dominate where conditions are best for its survival growth. Fine fescues will become dominant under dry, shady conditions; Poa trivialis where moist shade is predominant and Kentucky Bluegrasses where sunlight is not limited.

The problem to be faced then is the segregation of plant type and the lack of gradual transition from shade to sun. The thin, wire-like blades of fine fescues and the relatively wide blades of Kentucky Bluegrass most often cause very distinct and abrupt transitions from sun to full shade, a quality not altogether desirable.

The need for sod-forming grasses adapted to shady conditions has long been recognized by companies such as Northrup, King & Co. A portion of their breeding and evaluation program on turfgrasses is directed toward reaching this objective. New varieties are screened for shade tolerance. Those that pass initial screenings are further tested.

Howard Kaerwer, chief turf agronomist at Northrup King, realizes the differences in light quality which occur under trees and other forms of shade. He recently tested new and established varieties in a series of three tests: turf trials in full sunlight, under a Saran shade screen and under a natural tree canopy. The agronomist currently has over 500 different grasses planted under natural shade conditions at Northrup King's trial grounds in Eden Prairie, Minn.

To establish grasses under these test conditions, four-inch plugs of mature sod, grown in full sunlight, were transplanted early last spring before established trees had a chance to leaf out. In this way, the turf candidates could take advantage of enough sunlight to become well established before the much denser shade followed. Fertilizer was used moderately and the plots were watered only when required. Each plot was kept ap-

(continued on page 42)

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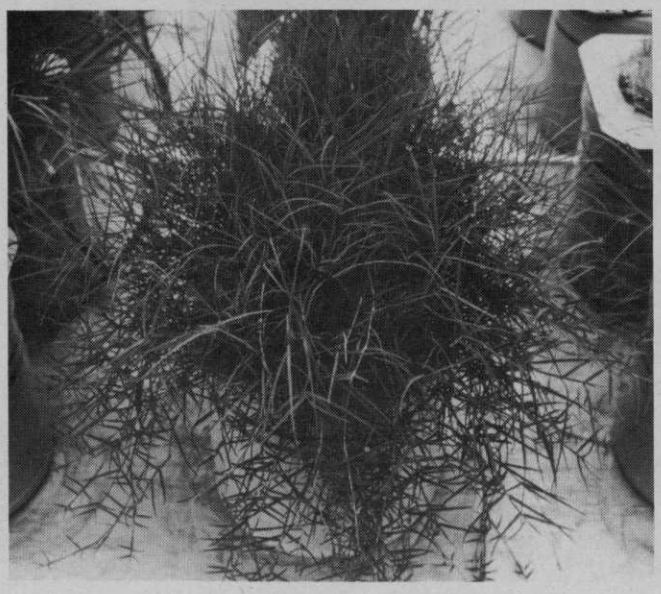

Figure 1, complete nutrient solution.

Figure 2, minus nitrogen.

NUTRITION *(from page 14)*
value of a good potassium level in the soil and plant cannot be overemphasized.

The relative nutritional needs of the turf plant are easily determined when nutrient solution culture techniques are used. In a University of Florida study, Tifgreen Bermudagrass was fed a solution containing all esential nutrient elements (figure 1). the N-P-K nutrient levels in grass leaf tissue are listed in Table I.

When nitrogen was withheld from the nutrient solution (figure 2), there was a marked reduction in plant growth as reflected in lower dry weight yield as well as in the nitrogen level of the plant.

The smallest reduction in dry weight yield and in the phosphorus level in tissue occurred when phos-

(continued on page 38)

Arborist Assn. Offers Expanded Home Study Course

The National Arborist Association is now offering an expanded Home Study Program to members and non-members.

The program consists of an educational study course designed to provide professional arborists and their staff members with increased technical and practical proficiency.

Originally compiled by the Forestry Department faculty members of Michigan State University, the course consists of two series of eight individual study sessions each.

Subjects for the first series include: General Introduction to Commercial Arboriculture, Anatomy and Physiology of Trees, Soils, Pruning of Shade and Ornamental Trees (two sessions), Identification and Selection of Trees, Fertilizing and Watering Shade and Ornamental Trees.

The second series of the HSP includes such subjects as: Diagnosis of Shade and Ornamental Tree Problems, Non-Parasitic Injuries of Shade and Ornamental Trees, Insect Problems of Shade and Ornamental Trees, Disease Problems of Shade and Ornamental Trees, Pollution Damage to Trees and Ornamental Plants, Spraying Techniques for Shade and Ornamental Trees, Bracing, Cabling and Tree Surgery of Shade and Ornamental Trees, Safety Equipment Care and Maintenance—Shade and Ornamental Trees.

HSP non-member enrollment fees are $75 per enrollee for each series of eight sessions, while costs for NAA firms are $50 per HSP recipient.

For enrollment applications and any other information concerning the HSP, please circle (719) on the reply card.

Phase II Guidelines For Nurserymen

Phase II economic stabilization guidelines are now available for nurserymen.

Under the new regulations, retailers must post in their retail outlets a 22" by 28" sign indicating the base prices for 40 Phase II-covered items having the highest dollar sales volume or which account for 50% of total sales. Base prices are calculated as highest prices charged customers during the freeze base period of July 16 to August 14, 1971.

The regulations also specify that no retailer may raise his prices on any covered item until the sign showing his 40 base price products is displayed.

In calculating a possible price increase the retailer must abide by the regulations indicating a firm may not increase its prices beyond that amount which would bring its net profit rate before taxes (as a percentage of sales) to a level greater than that of the base period. (This base period is defined as the average of any two of the past three fiscal years of a firm, ending prior to August 15, 1971.) Within that range, a 2.5% price increase guideline was announced by the Price Commission in an attempt to reduce inflation to no more than 2 to 3% by the end of 1972.

Retailers are permitted to apply their customary percentage markups to the amount of the import surcharge (10%) paid on a product entering the United States.

Also, the Wage Board's 5.5% general wage and salary standard applies to a retailer's employees.

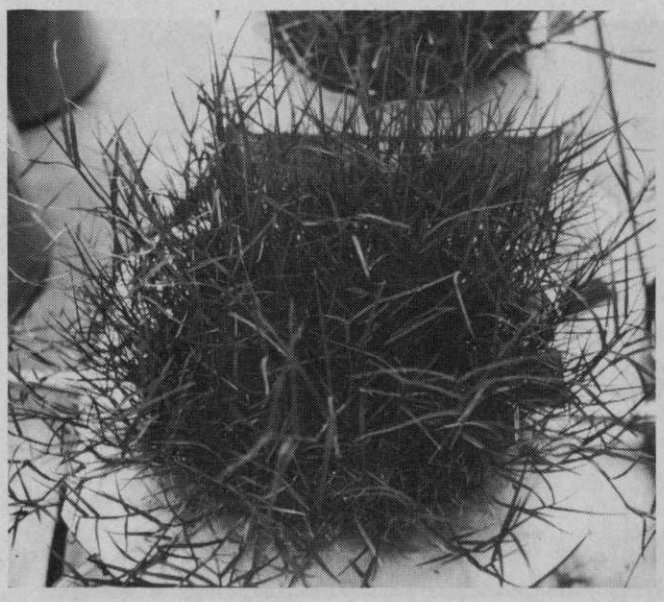

Figure 3, minus phosphorus.

Figure 4, minus potassium.

NUTRITION *(from page 37)*
phorus was omitted from the nutrient solution (figure 3).

Potassium's absence (figure 4) from the nutrient solution caused a reduction in K tissue levels and in dry weight.

When N, P, and K (figure 5) were all removed the dry weight yield was nearly the same as when only nitrogen was removed indicating a high dependence on nitrogen for vegative growth.

This study indicated that when one required nutrient element is omitted from a fertilizer program, there may be a somewhat abnormal increase in other nturients in the plant.

For example, when potassium was omitted nitrogen levels became higher (3.17%-N) than they were when the plant was fed optimum levels of all necessary nutrients

(continued on page 46)

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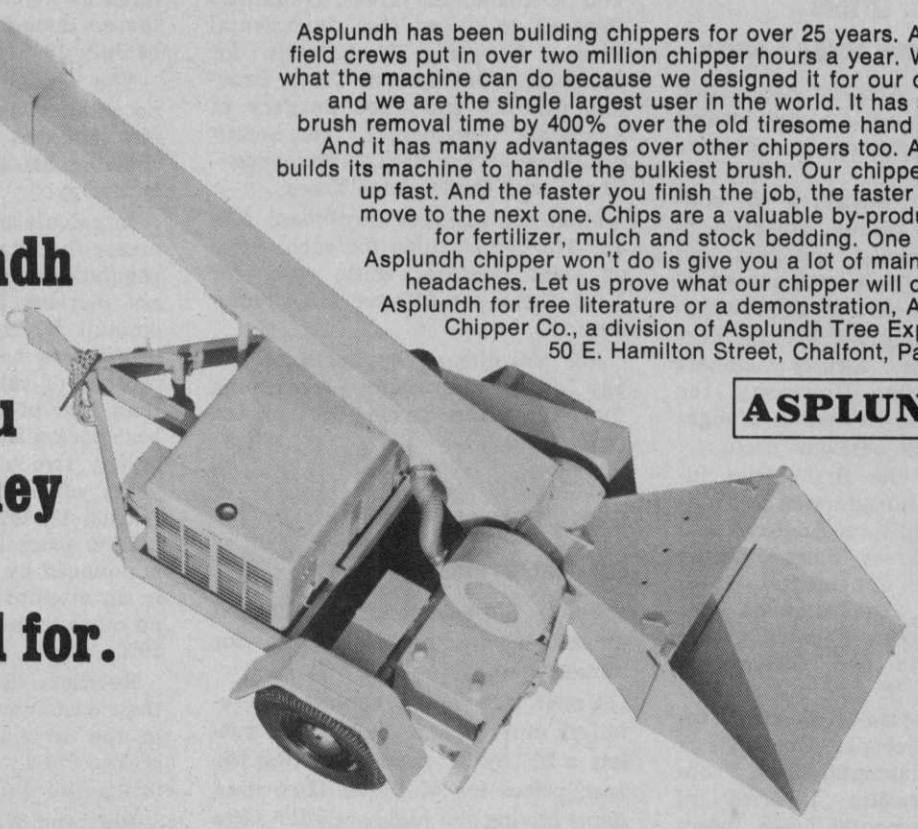

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Check this no-nonsense comparison of lightweight chain saws!

FEATURE	PIONEER		HOMELITE			McCULLOCH		Skil 610	Remington Mighty Mite Auto	Poulan XXV
	Holiday II (1072)	2071	EZ	150 Auto	EZ-250	Mini Mac 6	Power Mac 6			
Starting	Automatic Easy "Arc"	Automatic Easy "Arc"	Manual Compression Release	No Comp. Release	Manual Compression Release	No Comp. Release	No Comp. Release	No Comp. Release	No Comp. Release	No Comp. Release
Noise @ 50 Ft.	80 Db(A)	75 Db(A)	78 Db(A)	80 Db(A)	77 Db(A)	88 Db(A)	80 Db(A)	79 Db(A)	75 Db(A)	87 Db(A)
Muffler	Directional No Screen	Baffle Plate & Spark Arresting Screen	Baffle Plate No Screen	Baffle Plate No Screen	Baffle Plate No Screen	Straight Stack No Screen	Baffle Plate No Screen	Baffle Plate No Screen	Baffle Plate No Screen	Straight Stack No Screen
Displacement & Weight	3.14 cu. in. 9 lb. 8 oz.	3.2 cu. in. 9 lb. 10 oz.	2.3 cu. in. 9 lb. 7 oz.	2.65 cu. in. 9 lb. 1 oz.	2.5 cu. in. 10 lb. 8 oz.	1.7 cu. in. 6 lb. 12 oz.	2.2 cu. in. 7 lb. 4 oz.	2.2 cu. in. 6 lb. 7 oz.	2.1 cu. in. 6 lb. 8 oz.	2.2 cu. in. 8 lb. 9 oz.
Crank & Rod	3 Pce. 1 Pce.	3 Pce. 1 Pce.	1 Pce. 2 Pce.	1 Pce. 2 Pce.	1 Pce. 2 Pce.	1 Pce. 2 Pce.	1 Pce. 2 Pce.	1 Pce.* 1 Pce.	1 Pce. 2 Pce.	1 Pce. 2 Pce.
Bar	14" Hard Nose	16" Roller Nose	16" Hard Nose	12" Hard Nose	15" Hard Nose	12" Hard Nose	12" Hard Nose	12" Hard Nose	12" Hard Nose	14" Hard Nose
Fuel Capacity	.90 pt.	.90 pt.	.91 pt.	1.0 pt.	.91 pt.	.71 pt.	.54 pt.	.62 pt.	.81 pt.	.63 pt.
Oil Capacity	.33 pt.	.33 pt.	.26 pt.	.50 pt.	.26 pt.	.21 pt.	.19 pt.	.24 pt.	.19 pt.	.45 pt.
Chain Oil Pump	Automatic	Automatic	Manual	Automatic Adjustable Delivery	Automatic & Manual	Manual	Automatic & Manual	Automatic & Manual	Automatic & Manual	Manual
Manufacturers Suggested Retail Price	149.95	164.95	184.95	149.95	224.95	129.95	199.95	179.95	159.95	129.95

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Feature for feature for feature, *nothing* can compare with our new Holiday II and our 2071. The facts speak for themselves. Case in point. Both our saws have exclusive "Easy-Arc" starting that gets the saw going with just a gentle pull. No one else can boast this feature.

Both saws are also equipped with the exclusive Sureguard Safety Chain.

And Pioneer lightweight chain saws are engineered by the same company who brought you the famous Lawn-Boy Power Mower and Johnson and Evinrude outboard motors. Superb engineering.

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Galesburg, Illinois, U.S.A.; Peterborough, Ontario, Canada

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Whatever the lie, fairway or green, choose **GORDON'S FAIRWAY BROADLEAF HERBICIDE** and **BENTGRASS BROADLEAF HERBICIDE**. They both contain "Trimec" Turf Herbicide and you will be the winner of the broadleaf doubles match.

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DISEASE CONTROL *(from page 16)*

control stripe smut and pink snow mold.

The third step concerns the application of Tersan SP in the fall. It has proven highly effective for control of snow mold (Typhula); and has also been outstanding for control of Pythium blight in any season. Application should be made early in November for snow mold.

Formerly, it was common for a snow mold chemical to be applied as late in the fall as possible, prior to snow. But the weatherman does not always cooperate and this has produced complications in application. Sometimes an unexpected snow would prevent an application. Tersan SP is low in solubility and can be applied earlier, while still lasting for a full season.

Disease control programs to date have primarily involved cool season grasses in the north for tees, greens and fairways. Reaction has been striking. A superintendent from one of the northern border states said: "Summertime diseases are not normally a big problem in our area, but snow mold is a problem every year. Last fall I used Tersan SP on my greens and tees and in the spring they were disease free. Even during the winter when my greens were free of snow they were not off-color."

A Midwest superintendent reported: "By following this program, I sprayed my greens and tees less and had better disease control and color than I have ever had before."

An Eastern superintendent said: "Early applications of Tersan LSR prevented Helminthosporium from being a problem and I saw no dollar-spot or large brown patch on my tees, greens or fairways. On greens and tees, I sprayed Tersan 1991 every 14 days, on fairways only three times the whole season."

Other programs for bentgrass courses in the south and for Bermudagrass greens that are overseeded have aroused similar enthusiasm. A superintendent in the south with bentgrass greens made this observation: "Following the disease control program large brown patch and dollar spot were no problem. When Pythium appeared Tersan SP stopped it right now."

A superintendent in the south with Bermudagrass greens commented: "Disease on Bermudagrass greens is seldom a major problem, but at overseeding, diseases can cause headaches. This year DuPont's suggestions solved the problem."

With response such as this, maintenance men concerned with industrial and school or college lawns may find new ways to develop and maintain these essential areas. Knowledge developed on golf fairway maintenance is readily adapted to similar turfs in similar geographic areas.

Disease control can obviously mean many different things to different people. To a golf superintendent or a turf manager, control means an area of turf that has a healthy green color and is free of any blemishes. To a plant pathologist working on disease control, however, the same phrase means the absence of any problem that is of his particular concern.

When a new fungicide is being developed for widespread use, however, it is essential that work be done in all areas of the country. The objective is to learn if a product is effective on all grasses and under varying environmental conditions and turf management practices. Naturally, it is understood that the rates of use for a fungicide can and will vary for different diseases and different disease pressures. And it is clear that one fungicide will not control all diseases. In fact, as time goes on and new candidate chemicals appear, the more useful compounds seem to be those that are more specific.

Another element that becomes more obvious in the development of new turf chemicals is the importance of a safety factor related to the use of a chemical on the plant. As plants are weakened by disease and insects, they are somewhat more susceptible to injury by any compound. Therefore a safety factor is most important.

The ideal product would be one that controls disease at a low rate but would also be safe on the plant at any rate. This ideal may seldom be reached, but nonetheless study concerning rates is of such a detailed nature that when recommended rates are established and a product is labeled, that product should indeed be used at the recommended rates. The old story — read and heed the label — is still excellent advice.

Another aspect of new product development in turf compounds concerns their lasting qualities and possible hazard to users. A long-term residual characteristic may not always be what is needed, despite an apparent economy. Environmental requirements must receive major attention. Application safety and safety to humans and animals are other elements that must be carefully studied prior to product introduction, with directions for handling

For More Details Circle (116) on Reply Card

being spelled out on product labels and in product literature.

A 13-state area was directly involved in numerous studies leading to the new "1-2-3" turf program. One of the striking new elements established in these studies was the importance of proper timing — as suggested by the yearly disease cycle of Helminthosporium spp. (See drawing on page 16.)

By using specific-type fungicides and timing applications to fit disease activity, it has been possible to to get more effective disease control with lighter rates and fewer applications of a compound. New systemic-type compounds such as Tersan 1991 have been of special value here. They can be used at low rates and with longer intervals between applications.

In addition, this new compound is not washed away and lost by a rain. With older compounds, much of the effectiveness of the treatment could be lost through a rain following closely after application.

Results with the "1-2-3" turf disease control program have been excellent. Superintendents have reported they used fewer applications of fungicides, at lower rates with better disease control, better turf color and more ease of mind.

This is an encouraging response—and one that may stimulate others to consider the program for their own needs. It is hoped that more turf managers will be interested in applying the program to their own needs in the coming year.

Incorporate Herbicide— Brochure Tells How

A brochure that describes how to construct a simple rig on tractor or tillage equipment for herbicide soil incorporation is available from Stauffer Chemical Company.

It provides illustrations and instructions for tooling up for both small and large acreage rigs and details various ways to mount tanks and nozzle systems. The rigs adapt for either liquid or granular herbicides. Design suggestions range from relatively simple rigs that suit small acreages and cost as little as $100, to more elaborate units with bigger tanks, pump and spray boom that can fit any tractor or disc.

Copies of the brochure **Ways To Mix Stauffer's Selective Herbicides In the Soil for Weed Control,** A-10316, are available from Stauffer Chemical Company, Dept. F. L., Agricultural Chemical Division, 299 Park Avenue, New York, N.Y. 10017.

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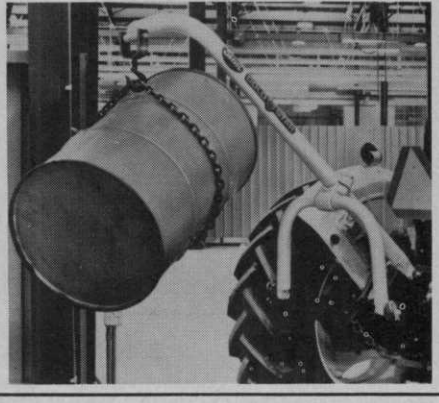

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SEARCH *(from page 36)*

proximately two inches in height and moved about every two weeks. At leaf fall in September, most of the entries under natural tree canopy were dead or severely thin.

A few experimental Kentucky Bluegrasses—the object of the trials—and several experimental fine fescue varieties were identified as being more tolerant to shade than varieties presently on the market. They provide the real hope for a turf that will be even-textured from full sunlight to shade.

One of the most outstanding finds was Nugget Kentucky Bluegrass, which is ready for commercial sale this year. Nugget has shown high resistance to leaf spot (Helminthosporium Spp.) diseases and powdery mildew. Due to the severe conditions of the trial, Nugget plants became more upright and the sod more open, but the stand was maintained to provide reasonably good grass cover.

All other Kentucky Bluegrass varieties presently available were unsatisfactory. Here are the results. Golfrood, Highlight and Ruby Creeping Red Fescue were the only named varieties which were satisfactory. Pennlawn was killed completely. Ranier thinned severely as did Jamestown and a number of lesser well-known fescue varieties. Illahee Creeping Red Fescue was a poor fourth but did produce a reasonably satisfactory turf.

In addition to this specific shade tolerance study, the company has also conducted extensive turf trials at the Eden Prairie location. Over 1800 different plots are monitored. These plots are grown under full sunlight and are mowed at three different mowing heights. Fertility and moisture levels are also varied. When superior varieties are identified, sod from these grasses is lifted and transplanted to both the screened and natural shaded areas for further evaluations.

Northrup, King & Co. is hopeful that through this research varieties can be found that will overcome many of the problems involved in managing turf under shade conditions.

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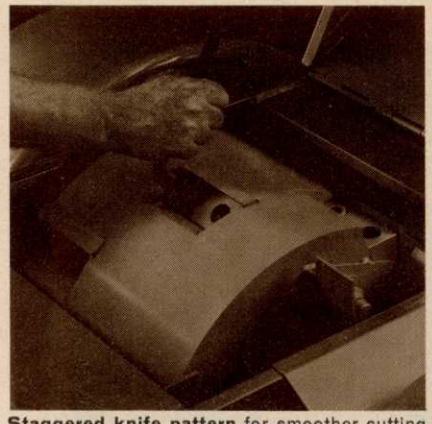

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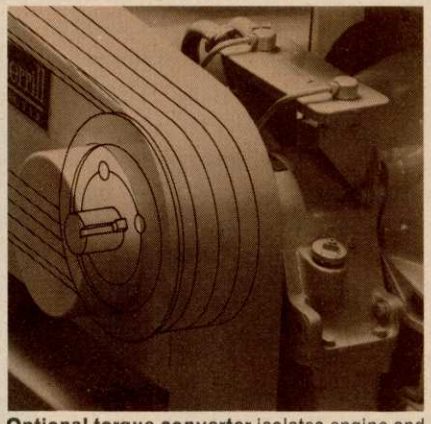

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Maryland Herbicide Studies Are Reported

Fair to good results with chemical control of major weed pests in special situations in southern Maryland and the Eastern Shore were reported at the twenty-sixth annual meeting of the Northeastern Weed Science Society in New York City.

Dr. James V. Parochetti, assistant professor of agronomy at the University of Maryland, presented a paper on his two-year study of herbicides applied to Johnsongrass in noncropland areas.

The Johnsongrass studies were conducted in Charles and Somerset counties. Ten treatments involving formulations of sodium chlorate, Hyvar X, Dowpon, Tandex and MSMA were tested.

Best control of Johnsongrass resulted from applications of herbicides containing sodium chlorate. Carryover residual control in the following year was also good. Hyvar X and Tandex were effective against established Johnsongrass stands when applied early in the season.

meeting dates

Pennsylvania Nursery Conference, Nittany Lion Inn, State College, Pa., Feb. 1-4.

Midwestern Chapter of the International Shade Tree Conference, Pick-Congress Hotel, Chicago, Ill., Feb. 8-10.

Weed Science Society of America, 12th meeting, Sheraton-Jefferson Hotel, St. Louis, Mo., Feb. 8-10.

Southern Chapter of the International Shade Tree Conference, Marriott Motel, Atlanta, Ga., Feb. 12-16.

Golf Course Superintendents Association of America, 43rd annual International Turfgrass Conference and Show, Cincinnati, Ohio, Feb. 13-18.

Maryland Arborists' Day, University of Maryland Center of Adult Education, College Park, Md., Feb. 15.

Golf Course Builders of America, first annual meeting, Stouffer Inn, Cincinnati, Ohio, Feb. 16.

Maryland Nurserymen's Day, University of Maryland Center of Adult Education, College Park, Md., Feb. 16.

American Society of Consulting Arborists, 6th annual meeting, International Inn, Tampa, Florida, February 17-18.

American Sod Producers Assn., conference and field day, Disneyland Hotel, Anaheim, Calif., Feb. 22-24.

Maryland Arborist's Day, University of Maryland, College Park, Md., Feb. 23.

Southern Connecticut Groundskeepers Association, Grounds Maintenance Conference, Waverly Inn, Cheshire, Conn., Feb. 23.

Iowa Shade Tree Disease and Insect Short Course, 15th annual, Memorial Union, Iowa State University Campus, Ames, Ia., Feb. 23-25.

Illinois Landscape Contractors Association, Arlington Park Convention & Exposition Center, Arlington Heights, Ill., Feb. 24-25.

Colorado Agricultural Aviation Assn., 24th Annual Meeting, Continental Motor-Hotel, Valley Highway and Speer Blvd., Denver, Colo. Feb. 28-29.

Midwest Turf Conference, Memorial Center, Purdue University, West Lafayette, Ind., Mar. 6-8.

Williamsburg Garden Symposium, Colonial Williamsburg Gardens, Va., Apr. 9-15.

Canadian Chapter of the International Shade Tree Conference, Holiday Inn, Hamilton, Ont., Canada, Apr. 14-15.

Florida Nurserymen & Growers Association, Walt Disneyworld, Orlando, Fla., May 25-27.

American Association of Nurserymen, Statler Hilton, Washington, D.C., July 15-19.

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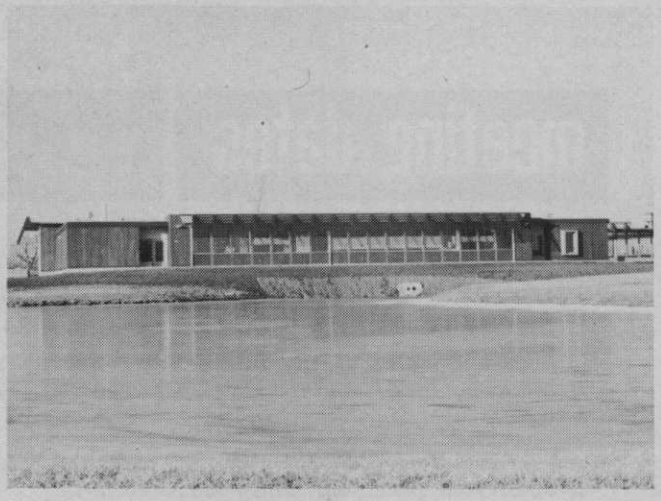
Lab Seeks Solutions To Tree Problems

By Dr. CHARLES L. WILSON
Plant Pathologist, Plant Research Division, Agricultural Research Service
U.S. Department of Agriculture
Delaware, Ohio



The Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio has a staff of three plant pathologists, a plant physiologist and a plant geneticist.

Dutch elm disease has been the main concern at the Agricultural Research Service Shade Tree and Ornamental Plants Lab in Delaware, Ohio, for a number of years. After 40 years of research we appear to be near a solution to this menacing problem.

The first hybrid elms developed in this country that are resistant to Dutch elm disease will be tested and increased this year. American elms that are resistant to Dutch elm disease have also been found and will be increased after further testing. A systemic fungicide has been shown to be highly toxic to the Dutch elm disease fungus. If the problems concerning the application of this chemical can be worked out, arborists will have a way of protecting trees from Dutch elm disease. There is even the possibility that trees can be "cured" if they are treated in the early stages of the disease.

Because of the severity of Dutch elm disease, another killing disease, elm phloem necrosis, has been overlooked. Scientists at the Delaware laboratory have recently discovered that elm phloem necrosis is apparently caused by a mycoplasma rather than a virus.

Mycoplasmas are the smallest living cells that are known. Unlike viruses they are killed by certain antibiotics. Preliminary findings indicate that elm phloem necrosis may be amenable to control by tetracycline antibiotics. The Delaware team is also looking for trees resistant to elm phloem necrosis.

An extensive breeding and selection program has been initiated at Delaware to develop trees that are better adapted for urban areas. In addition to a large collection of elms resistant to Dutch elm disease, this program includes an extensive collection of red maples from throughout their natural range, a green ash that is apparently resistant to borer attack, mimosas resistant to **Fusarium** wilt, and a number of cold-hardy shade tree selections.

Many of these trees are also being selected and bred for resistance to air pollution and other environmental stresses. Red maples are being screened for resistance to **Verticillium** wilt, moisture stress, air pollution, and high and low temperature extremes, and for such horticulturally desirable traits as rapid growth, symmetrical shape, and brilliant fall coloration.

Claims are constantly being made concerning the ability of trees to purify the air. Yet we find very little scientific evidence to support these claims. Delaware scientists have initiated research to determine the impact that urban trees are having on our air quality. Preliminary findings are exciting in that they indicate that trees may take up and recycle certain pollutants.

Scientists are also studying the effects of pollutants on the cells of trees. It has been found that the main damage that sulfur dioxide causes to the cell is destruction of chloroplasts where photosynthesis occurs. It is hoped that through these studies, diagnosis of the type and extent of pollution damage can be made by examining affected cells.

Are tree wound dressings beneficial? It is interesting to note that we really don't know. The main reason that we treat wounds is to protect the tree against invasion by rot fungi. Yet we have not looked behind tree wounds after they are treated to see what has happened.

A cooperative study with the U.S. Forest Service has been initiated to increase the level of knowledge on this subject. Trees have been artificially wounded and the wounds treated with various wound dressings. Over a five year period these trees will be analyzed and the extent of decay and discoloration behind the wound studied.

The Delaware group has also initiated a study to see whether different types of mulches around trees might protect them from salt damage.

With the removal of certain pesticides from the market we need new materials for such diseases as sycamore anthracnose and crown gall. Screening is going on at the Delaware lab for compounds to control these two diseases and some very effective compounds have been found.

The nursery industry and arborists are encouraged to become familiar with the work of the Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio. The scientific team including three plant pathologists, a plant physiologist and a plant geneticist are determined to stay tuned into the needs of nurserymen and aborists. You are encouraged to bring particular problems on trees and woody ornamentals to our attention.

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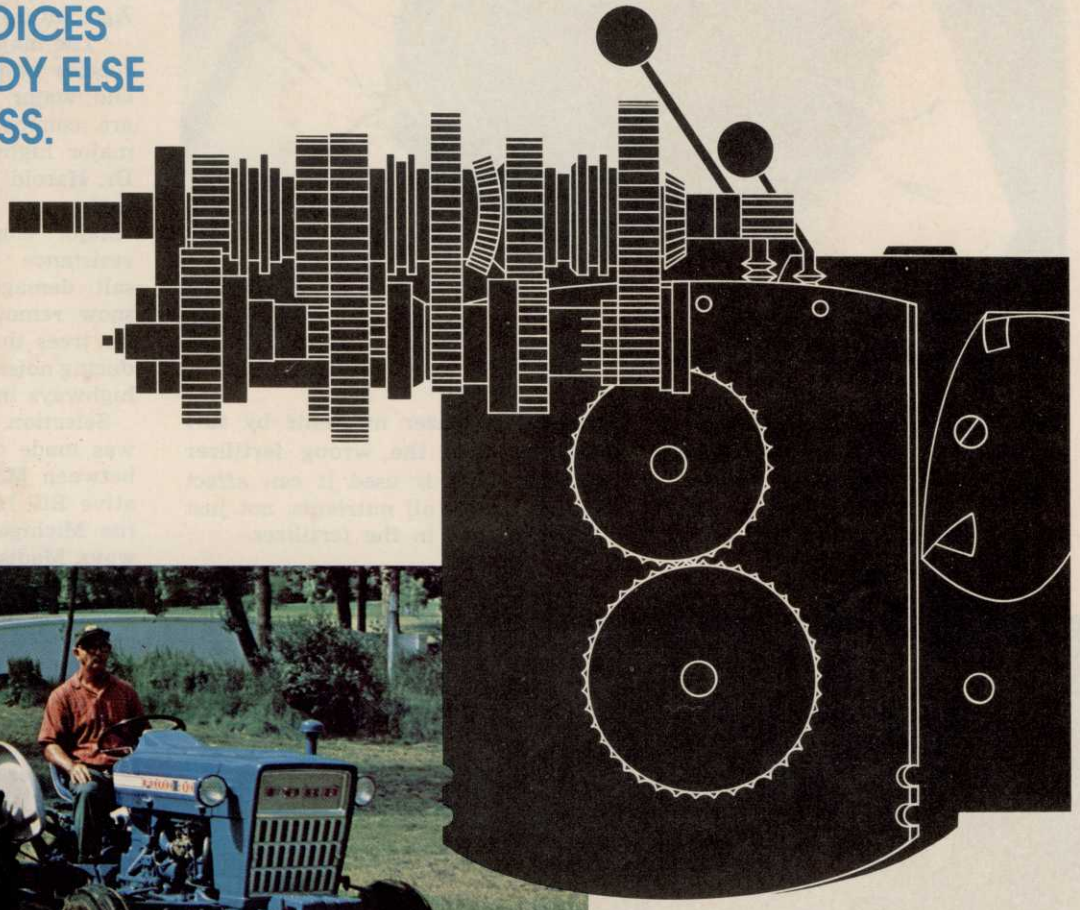

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For More Details Circle (107) on Reply Card

Figure 5, minus nitrogen, phosphorus and potassium.

NUTRITION *(from page 38)*
(2.80%-N). Phosphorus levels were also higher (0.19%-P vs. 0.32%-P).

These results indicate the important interactions involved in the uptake of fertilizer nutrients by turf plants. When the wrong fertilizer ratio or rate is used it can affect the uptake of all nutrients, not just those present in the fertilizer.

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Michigan To Study Highway Environment

Urban and suburban Detroit areas have been chosen as initial sites for research in improving the environment along Michigan highways.

The project on highway tree ecology was proposed by Michigan State University scientists and has been funded through a grant from the state legislature to the Michigan Agricultural Experiment Station.

"The major aim is to find the tree species best adapted to survive air and water pollution problems that are common to many stretches of major highways in Michigan," says Dr. Harold Davidson, MSU horticulturist and landscape tree expert. "Major emphasis will be on tree resistance to pollution, especially salt damage that can arise from snow removal. We will also look for trees that have potential for reducing noise and dust problems along highways in residential areas."

Selection of the first research site was made during a recent meeting between MSU scientists, Representative Bill Huffman, Jack Burton of the Michigan Department of Highways, Madison Heights City Manager Estol Swem, and Hazel Park City Manager Vance Fouts.

Selection of an appropriate site for experimental tree plantings in the City of Detroit is expected in the near future.

On a long-term basis, other research sites are planned for stretches of other major highways in both rural and urban locations.

Toro Dealers Go Back To School

Good service, the key to consumer satisfaction is the theme stressed by The Toro Company in a series of Dealer Service Schools.

The annual training program for Toro dealer personnel began Dec. 15 and will continue through April 1. The schools are being sponsored in cooperation with Toro distributors.

According to Ross E. Nelson, Toro's manager of customer service, each school will consist of three sessions running simultaneously for 2 to 2½ hours. Sessions will cover maintenance of riders / tractors, mowers, snowthrowers (where applicable), the Whirlwind Rider and the Shredder-Bagger, both new products for 1972; and policy and dealer operations, warranty programs; engine diagnostics, and gearbox teardowns.

Streams Can Clean Up Organic Pollution

All organic pollution need not be eliminated from streams to keep them clean enough to support trout and other clean-water life.

This is the findings of a study conducted by Dr. Kenneth W. Cummins, fresh-water ecologist from Michigan State University's Kellogg Biological Station. He conducted a stream leaf-litter study to determine how fast a stream decomposes organic matter.

Cummins worked closely with systems scientists and engineers. They "enriched" experimental and control streams with large quantities of water-soluble organic matter made from leaves to see what materials the stream could clean up.

"We really loaded the stream with dissolved organic material at quantities of about 1 part of the organic matter for every 25,000 parts of stream water," said Dr. Cummins. That is 10 times the natural levels of organic matter from leaves in a typical trout stream.

"Some pretty resistant stuff comes out of such natural leaf litter. This was very complex organic material with substances including organic acids, cellulose, phenolic compounds and tannic acids," he continued.

Bacterial count per mililiter went from several thousand to six million and then back to several thousand. This explosion of bacterial population turned the experimental stream dark brown. Oxygen levels fell before the bacterial growth reached its peak.

Oxygen depletion was probably mainly due to the organic matter shielding light from the algae growing on the rocks, determined Dr. Cummins.

There was enough mixing and turbulence in the stream to provide oxygen for the bacteria. The little additional oxygen previously manufactured by algae was no longer generated. Instead the tiny plants burned the stream's oxygen as did the bacteria.

Even when the oxygen levels sagged, the water was still 60 to 65 percent saturated with oxygen, said the researcher.

Turbulence is a device pollution fighters have used for a long time to increase oxygen levels in waterways.

The ecologist pointed out that water plants and animals did their clean-up jobs without massive mortality to either the animals or other components of the stream. After the first week and a half, except for minor variations, the experimental stream had pretty well returned to normal, the scientist reported.

Dr. Robert H. Boling, MSU engineer and systems scientist worked with Dr. Cummins and other ecologists in this test. "By assembling such data from this stream model system we can analyze similar streams," he said.

The research team expect that some of their findings will apply to other types of organic pollution, such as sewage and farm run-off of organic matter, but that many other controlled studies are needed before accurate predictions can be made.

Scientist Advocates Tailoring Plants To Soil

Tailoring plants to fit the soil may be more effective and economical in many cases than changing the soil to fit a particular plant, said a USDA soil scientist.

Dr. Charles D. Foy of Agricultural Research Service was speaking about strongly acid surface soils, subsoils, and mine spoils laced with toxic levels of aluminum and other mineral elements. The acidity makes the minerals more available to plants and limits their growth.

Dr. Foy, stationed at the U.S. Soils Laboratory, Beltsville, Md., said that mineral element toxicities cannot always be corrected economically by conventional liming and fertilization practices that neutralize the acidity. A promising approach is the selection or breeding of plants more specifically adapted to the growth-limiting factors present.

"A plant breeding approach has a tremendous potential for solving some of the more difficult soil management and mineral nutrition problems," the soil scientist said.

"In some cases," he said, "plant breeding may mean greatly increased yields of the crop species presently grown through the use of more tolerant varieties; in others, the increased food production may result from the introduction of more desirable crop species not previously adapted to a region."

He said any plant breeding program should include the identification of plant form, structure, function and chemical processes associated with tolerance to a given soil factor. These plant characteristics may be useful to plant breeders as screening tools for large plant populations.

"Plant varieties differing in tolerance to excess mineral elements are also valuable as indicators of metal toxicities in soils and as tools for studying the mechanisms of mineral element toxicity or tolerance in plants," Dr. Foy said.

"The understanding of such fundamental plant processes will almost certainly lead to improved soil fertilization and management practices," he concluded.

Miracle of the Land Stauffer Presentation

The role of crop-protection chemicals in raising our standard of living are examined at length in an audio-visual show, "Miracle on the Land," produced by Stauffer Chemical Company.

A battery of synchroized, tape-programed projectors, multiple screens, hundreds of color slides, and an orginal musical score are used to trace the history of American agriculture, from the ealiest settlers to the present, in this unique 20-minute show.

The basic message of the presentation is agriculture's importance to our national economy.

Before the 1860's, the American farmer produced enough to feed and clothe himself and three other persons. By World War II that figure had increased to himself and 11 others. In just the past quarter century the figure has grown to himself and 45 others.

With an exciting sound track and a whirlwind projection of slides, panoramas of agricultural America unfold across the five projection screens. The story reminds viewers that it was not easy to achieve our modern power to produce food for millions of city dwellers who are free of the need to go out and hunt for game or grow their own crops.

Without the technology of today's agriculture we would all be back on the land with a hoe, trying to grow our food, instead of having "the time to become scientists, doctors, artists, or put a man on the moon," "Miracle on the Land" points out.

Man has had to use his intelligence over thousands of years to adapt things to his needs. The same intelligence that brought him this far must continue to expand our modern miracle of agricultural production while working out problems of our environment, the show concludes.

SULFUR *(from page 22)*
to turfgrasses. One big advantage of potassium sulfate is that the potash has less of a tendency to burn turf. It is somewhat less soluble and thus releases more slowly and lasts longer. The big plus is the presence of sulfur, a major plant food element that frequently is neglected and, without which, no living plant can thrive.

Why is sulfur important? In the absence of sulfur, a turfgrass exhibits a chlorosis that frequently occurs as an intense yellow color. In mild cases one may think of nitrogen deficiency or even iron deficiency.

On the positive side, we find that sulfur enhances color, density and growth. There seems to be a direct relationship with nitrogen. The turfgrass fertilized with the higher quantities of nitrogen show increased response to sulfur. It has been reported that when 12 pounds of nitrogen are used, there is a requirement for 8 pounds of potassium oxide and 3.45 pounds of sulfur. This is remarkably close to the proportions of potassium and sulfur in potassium sulfate. This example alone explains why potassium sulfate costs a bit more than potassium chloride and is worth much more.

Is the chlorine in potassium chloride bad? Chlorine is a plant food only in very small quantities. Beyond that it is a strong plant poison. It adds to the salt index which often is highly undesirable. With potassium chloride, the turf is more likely to be burned, whereas potassium sulfate has a high safety factor. Potassium chloride is more soluble and is more hygroscopic (attracts water) which creates caking in the bag.

In potassium sulfate, the sulfur is carried as the sulfate ion which can be taken directly into the plant. Sulfate ions are helpful when soils are compacted.

There are several additional advantages in having sulfur built into a potassium system which is used in balance with nitrogen and phosphorus. These include:

1. Sulfur aids in production of chlorophyll (green color) but it does not occur in this substance.
2. Sulfur is necessary for formation of several amino acids that are components of protein.
3. Sulfur activates several important enzymes.
4. Sulfur is important in the production of Vitamin B_1 (thiamin), biotia, coenzyme A, and glutathione.
5. Sulfur is associated with the building of protoplasm and is related to increased cold and drought resistance in some plants.
6. Sulfur is involved with an enzyme that is necessary to nitrogen fixation by microorganisms.

There are other vital functions in plant nutrition for which sulfur is required, some too technical to include here.

Remember, the need for sulfur fertilization is closely related to the amount of nitrogen fertilizer being applied.

The net effects of adequate sulfur in combination with N, P and K are several:

1. Better decomposition of residues (thatch)
2. Stimulation of soil microorganisms
3. improved color, density and composition of turfgrass
4. greater drought tolerance
5. improved winter hardiness

(continued on page 54)

Cut mowing time in half around greens and traps

National Triplex mowers cut 68 and 84 inches wide, several times the width of a hand-propelled trimmer mower. But they maneuver sharply, climb banks, cut on hillsides. You get the advantages of a wide cut, with small-mower neatness, do a precision job without skips or scalping.

Reels reach over to trim the edges of traps and they're free-floating to dip down in hollows and climb over ridges. Trim close around trees and hazards, cut through heavy growth on roadsides.

Built to quality standards of performance and durability.

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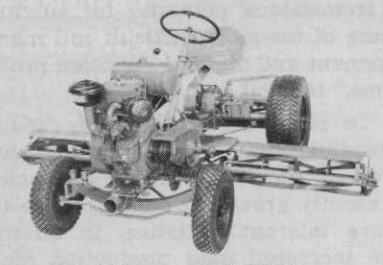

84-inch TRIPLEX

Handles the whole job on 3-par courses except for greens. Rugged and dependable.

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For More Details Circle (146) on Reply Card

◆ For More Details on Preceding Page Circle (126) on Reply Card

industry people on the move

Herbert H. Lyon, named to board of directors, The Dow Chemical Company, Midland, Mich. Prior to appointment, he was vice president. He has served Dow for 25 years.

* * *

Maurice Rosner, appointed general manager of Warren's Turf Nursery, Palos Park, Ill. Formerly manager of Warren's Sullivan, Wisc. operation. He will devote time to the continuing research program in developing new and better grasses.

* * *

Dr. Joseph G. Bower, to assistant product manager, chemical products, Marketing Dept., U.S. Borax, from senior technical representative, new product development department of U.S. Borax Research Corp., a subsidiary. Will move to the Corporation headquarters in Los Angeles.

* * *

James H. Powell, named sales manager for Frost Co., Arlington, Mass. Has led company sales every year since 1954, covering Maine and the east half of Massachusetts.

* * *

Charles L. Milles, Jr., joined Nor-Am Agricultural Products, Inc. as materials manager. Will manage traffic, purchasing and sales order for company's Chicago headquarters.

* * *

Robert W. Bennett, appointed assistant manager of FMC Corporation's Niagara Chemical Division at Middleport, N.Y. Heads Niagara's seed, planning, international development, manufacturing and administrative departments and Canadian operation.

* * *

Harold B. Kothe, named manager - quality assurance by Jacobsen Manufacturing Company, Racine, Wisc. Replaces the late Riley Chambers. Will handle quality control for all Jacobsen products produced in Racine, Wisc., Brookhaven, Miss., Olathe, Kans., and Minneapolis, Minn.

* * *

Dale Kennedy, promoted to branch manager, Thompson-Hayward's Thomasville chemical distribution center, N.C. Formerly was plant and operations manager at the N.C. center. He has been with Thompson-Hayward for three years.

* * *

Dr. Richard A. Schwartzbeck, promoted to section supervisor for Gulf Research & Development Company, Kansas City Laboratory. Will head up pesticide screening and development section for the agricultural chemicals division.

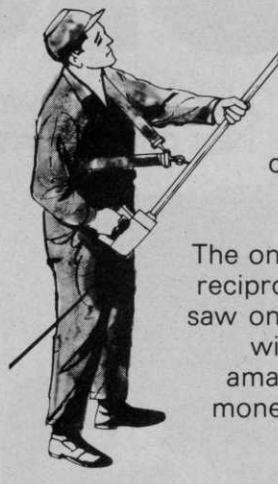
* * *

John M. Beattie, appointed as director of engineering and manufacturing in the turf products division of The Toro Company, Minneapolis, Minn. Named last year as a principal design engineer, a title given to engineers performing in a creative technical manner beyond Toro's normal high standards.

* * *

Philip S. Nathan, promoted to director of marketing, agricultural business group, Velsicol Chemical Corporation, Chicago. New responsibilities include advertising and promotion, merchandising, market planning and market research for company's agricultural, brush and pest control and lawn and garden markets.

Electric Tree Surgeon Pruning Saw



Reaches 15 feet to prune and cut clean without injury to bark. Easy way to prune for orchards, nurseries, parks, golf courses, estates, homes ...for all landscapers.

The only REMOTE CONTROL reciprocating electric pruning saw on the market. Designed with the professional and amateur in mind. Time and money savings will reflect in increased profits.

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GASOLINE ENGINE POWERED HOLE DIGGER

The World's largest selling one man gas engine hole digger. For post setting, tree root fertilizing, tree planting, ice fishing, blasting, and soil testing. Drills holes 1-5/8" to 9" in diameter and 30" to 45" deep.

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Write or Phone: WALTER PATTERSON
Marketing Manager (414) 261-7350

TREE INJECTION RESPONSE

Enjoyed and benefitted from Del Kennedy's article on tree injection in the November 1971 issue. However, a letter adressed to him at San Jose was not specific enough to reach him. Will you please put his correct . . . address on the enclosed letter and send it to him. We find much of professional interest in your . . . magazine. Thanks for your help. I would add that we frequently use the Reader Service Card that comes with each issue. JOHN H. NEBELSICK, Acme Tree Service, Lincoln, Neb.

GLADLY

Upon returning from vacation, my copy of the December 1971 issue of WEEDS TREES and TURF, page 80, impressed me very much.

You are to be congratulated for the nice article on our "Walk in and Talk" program. It is very well presented. . . . Your fine article definitely gives us a well known shot in the arm.

If you possibly can spare about 6 copies of page 80, we will appreciate your forwarding to us. . . . JAMES R. BURDETT, president, Burdett's Inc., Lombard, Ill.

NEW FROM ALLIS-CHALMERS

THE 616

Not quite a lawn tractor
Not quite a farm tractor

But quite a tractor!

Full-muscled as a small agricultural tractor . . . safe and maneuverable as a lawn and garden tractor. The all-new 16½ hp 616 tractor from Allis-Chalmers offers the best of both for just about any in-between job you can name. Features galore with hydrostatic drive, electric PTO and optional three point hitch. It's a small wonder for small acreage farming . . . sod farms . . . seed bed preparation and cultivation . . . large area mowing . . . contract lawn care . . . landscaping . . . snow removal. There's a complete lineup of accessories available from mower to plow . . . fork lift to front end loader . . . and more. See the 616 . . . try the 616 at your Allis-Chalmers dealer. It's quite a tractor.

ALLIS-CHALMERS
OUTDOOR & LEISURE PRODUCTS
Box 512, Milwaukee, WI 53201

Chlevin Resigns As GCSAA Director

Ben J. Chlevin resigned as Executive Director of the Golf Course Superintendents Association of America, effective January 31, 1972.

The resignation was accepted with regret by the GCSAA Executive Committee, according to Association President Richard C. Blake, who noted that Chlevin's seven years with the Association covered an important period of growth and development in the organization's 45-year history.

During this period, Blake said, the Association membership increased from 2,000 to over 3,000 members; the Association's annual budget doubled from $275,000 to over $550,000; the Annual Conference attendance swelled from 2,500 to 3,500, while the Equipment Show exhibit space increased from 175 to nearly 400 booths.

Blake said that Chlevin indicated a desire to return to public relations activity within the golf industry with which he has been so closely identified during his entire business career. Blake added that the January 31 effective date of Chlevin's resignation was set by mutual agreement in order to permit him to conclude final arrangements for the 1972 GCSAA conference scheduled next month in Cincinnati, Ohio, and to complete other current projects. In the meantime, Blake said, the GCSAA Executive Committee is conducting a search for Chlevin's replacement.

Coming In March

Weed Control Special

SOD INDUSTRY SECTION

Consider Thin Cut Sod

Depth at which sod is cut is an important factor affecting the productive life of a sod field, the rate of establishment, the ease of handling, transporting and laying, and the economics of sod production, says John R. Hall, turf specialist, University of Maryland. Proper cutting thickness will vary depending on species, soil texture, sod density, and the amount of root and rhizome development.

No sod farm has an infinite topsoil depth, he says. Therefore, the length of life of every sod farm is a function of the number of harvests and the depth of those harvests. Simple mathematics indicate that cutting sod at a three-fourths inch cutting depth instead of a one and one-half inch cutting depth almost doubles the life of a sod farm.

Research indicates that thin-cut sods have better rooting ability than thick-cut sods. Merion Kentucky Bluegrass sod cut at a one-half inch depth gives increased rates of root appearance, increased root density, and greater rooting depth compared with one inch and one and one-half inch cutting depths, the specialist points out. For tall-fescue-Kentucky bluegrass mixtures, three-fourth inch sod cutting depths are more favorable than one and one-fourth inch cutting depths.

The increased weight created by the excessive cutting depth increases the frequency of harvesting machine breakdowns. Some of the sod handling machines produced today are not being built to work with thick sod day after day. Sod producers can generally rely on repair costs increasing linearly with the thickness of sod, Hall says.

Thick sod increases the probability of overload fines for the transporters. The weight of one and one-fourth inch sod is about 175 tons per acre, while three-fourth inch sod weighs only 100 tons per acre. The heavier sod means that fewer pallets constitute a load, and often what would normally be considered a load turns into an overload. Overload fines in the State of Maryland are currently assessed at the rate of two cents a pound for the first 5,000 pounds over six cents a pound for any amount greater than 5,000. The cost can be considerable.

The increased work caused by the extra weight has been protested by sod workers. They don't enjoy lifting an extra 75 tons of weight to cover an acre of ground.

Hall says the economic soundness of giving away topsoil is questionable. Selling one and one-fourth inch sod for the same price as one-half inch sod is simply giving the buyer about 108 cubic yards of topsoil. The current price of sterilized topsoil delivered less than 20 miles is about $4.50 per cubic yard. This means the purchaser of one and one-fourth inch sod is getting about $485 worth of topsoil for every acre of sod he buys.

Thin-cut sod is generally best in every situation. However, age, density, and species of the sod, soil texture, moisture, and site preparation are going to have an effect on the final decision of cutting depth. Where site preparation is poor, fertility management programs are deficient, and the laid sod is not going to get ample watering, it is possible that thicker sod might be beneficial. Thick sod can never correct poor management practices, however, in most cases thin-cut sod is superior to thick-cut sod, concludes Hall.

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Kentucky Bluegrass.

Perhaps the best all-around turfgrass available today.

Pennstar Kentucky Bluegrass (Poa pratensis) is an improved variety developed by Penn State after more than 15 years of testing. Pennstar is highly resistant to stripe smut, rust and leaf spot. It's not overly aggressive and has a medium blue-green color — ideal for mixtures.

Other Pennstar characteristics include good density, drought resistance, persistence under short mowing and moderate-to-low fertility levels. It does not produce damaging quantities of thatch and is adapted throughout all normal bluegrass areas. Send for complete data.

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Vermeer TS-66T Tree Spade Does It . . . Automatically!

"The Diggin' Dutchman" introduces "Instant Shade" . . . with an automatic tree mover that digs, balls, transports and plants large diameter trees in minutes. The Vermeer TS-66T is fast . . . it's economical . . . it's automatic. One man and one TS-66T can handle the entire job in minutes. That's why we call it "Instant Shade," and that's why Vermeer Tree Spades are used by landscapers, nurseries, cities, rental yards and tree service firms everywhere. Write "The Diggin' Dutchman" for information and complete literature.

Another Tree Spade From . . .

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Truck-mounted TS-66T Tree Spade transplants big 6" diameter tree with hydraulically-operated, high tensile steel spades. Digs 66" diameter tree ball, down to 60" deep to prevent root damage.

For More Details Circle (103) on Reply Card

Brouwer Turf of Canada Introduces Sod Harvester

A new and re-designed sod harvester is being marketed this year by Brouwer Turf Equipment Ltd., Keswick, Ontario, Canada.

The unit uses two to three men for harvesting and the manufacturer reports that it replaces four to seven men in the operation.

Known as the Brouwer Sod Harvester, it cuts rolls and loads on pallets up to 1300 square yards of sod per hour. The maker states that with light sod, one man can load the pallets. Heavier sod requires two men. The pallet being loaded is carried on the 3 point hitch lift of the tractor.

The conveyor is driven by PTO of the tractor and V-belts. The cutting blade is powered by a hydraulic oil motor. Widths of cut are available in 16, 18, and 24-inch.

The unit was exhibited at the recent Ohio Turfgrass Foundation show at Cleveland. (For more information, circle reader card No. 720).

Brouwer Sod Harvester

Mutoza Elected To Calif. Landscape Board

A vice president of the largest producer of "instant grass" or sod in the State of California has been elected to the Board of directors of the California Landscape Contractors Association.

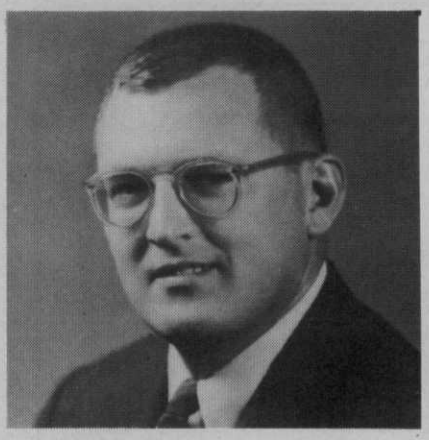
Edward Mutoza of Nunes Turfgrass Nurseries, Inc., Patterson, becomes the first associate member of the 600 member organization made up of landscape contractors and their suppliers. Mutoza will represent the latter group on the board and will start serving immediately.

Mutoza was honored by the statewide group in 1969 as the CLCA Man of the Year. His appointment represents the first associate member to be named to the executive board in the association's 21 year history.

California Landscape Contractors Association, the largest such group in the United States, is a non-profit trade organization dedicated to the beautification and enrichment of people's lives throughout landscaping.

Nunes Turfgrass Nurseries grows over 600 acres of sod out of 1200 now being harvested in the state.

American Sod Producers
Assn. Conference & Field Day
Disneyland Hotel
California
February 22-24



Dr. Jack C. Harper, professor of agronomy, Penn State University.

Golf Course Builders To Meet In Cincinnati

The executive director of the National Golf Foundation, a Penn State University agronomist, a panel of golf course contractors and an architect will be the feature of the first annual meeting of the Golf Builders of America, February 16, in Cincinnati.

The Golf Course Builders of America, now in their second year of growth, will hold a dinner and program during the national convention and trade show of the Golf Course Superintendents Association of America. The evening of February 16 is an open night at the Superintendents convention.

Following dinner at Stouffer's Inn, Don A. Rossi, executive director of the National Golf Foundation, Chicago, will be the opening speaker. He will be followed by John C. Harper, an extension agronomist at Penn State. Professor Harper will speak on "Do's and Don'ts of Golf Course Construction".

A trio of two golf course contractors, Henry L. Nielsen Jr., of Warwick, N.Y. and Lee A. Bilberry of Houston, Texas, and a golf course architect of Port Washington, N.Y., Frank Duane, will discuss golf course building and respond to questions from the audience. David Canavan of Culpeper, Va., past president of GCBA, will moderate the panel.

Robert Vincent Jr., of Benton, Pa., president of the Golf Course Builders of America, will chair the dinner and program.

Plant Food Carnival Slated For March

A new concept in merchandising promotion will be introduced when the "Bill Hofmann Wholesale Nurseries, Inc. of Hollywood, Fla., holds an all-day open house Plant Carnival, March 18.

Manager Tommie Hofmann, who concentrates on specimen, container grown indoor landscape plants, marketed worldwide, is inviting friends and customers as guests for the nursery's First Annual Plant Carnival from 8 to 8, Saturday the 18.

The day includes visiting, viewing more than 10,000 sun-dappled plants, plus food and refreshments for guests. The event will also include the regular monthly meeting of the Broward, FNGA, Chapter, beginning at 8 p.m.

Hofmann has arranged for overnight guest accommodations; and airport pickups.

CALLING ALL SOD GROWERS!

ASPA's Educational Conference and Field Day

Feb. 22-24, 1972
Disney Land Hotel
Anaheim, Calif.

ASPA members are extending a special invitation to all growers to join them in a major California event.

Call or write:
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Executive Secretary

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Penngift or Emerald varieties fully inoculated in 2¼ in. plastic pots

15¢ each .....per 100 or more
12½¢ each .....per 1000 or more

F.O.B., Nursery packing at cost. Best way to ship United Parcel Service or Bus. Minimum order of 120 plants.

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Keeping America Beautiful

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Good for everything you grow. Roses, trees, shrubs, flowers, lawns, fruits, vegetables. Spark vigorous growth.

Just dissolve in water, then sprinkle or spray. Fast acting, speeds results, no burning. High analysis 23-19-17%.

The favorite of experts for years!

RA-PID-GRO

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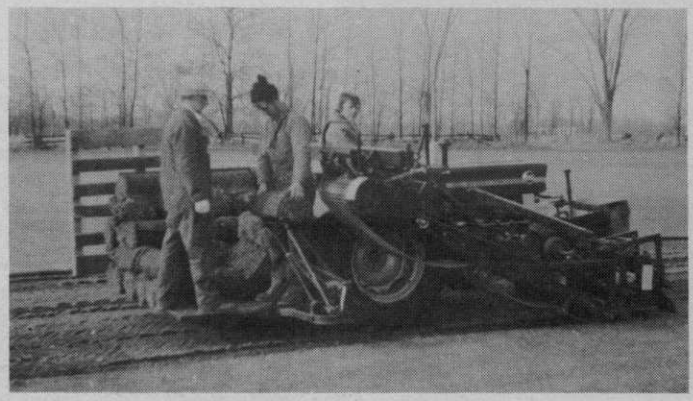
BROUWER SOD HARVESTER

Will cut, roll and load on pallets up to 1300 sq. yds. per hour with the help of 2 or 3 men. Available in 16", 18", 24".

This harvester is redesigned and has been in use for 3 years.

BROUWER TURF EQUIPMENT LTD.
R.R. 1, Keswick, Ontario, Canada
Tel. (416) 476-2442



For More Details Circle (145) on Reply Card

SULFUR *(from page 48)*

6. significant reduction in diseases

It is important to point out that, in many instances, a potash fertilizer is priced mainly on its potassium content. When due credit is given for the sulfur content of a material such as potassium sulfate, the apparent price discrepancy in comparison to potassium chloride disappears. If sulfur had to be purchased and applied separately as a supplement to potassium chloride, for example, it would be less expensive to purchase and apply potassium sulfate in the first place.

Well-documented studies by Goss, Gould and others in the Pacific Northwest reveal some very convincing reasons for applying sulfur along with nitrogen, phosphorus and potassium. Adequate sulfur reduced *Fusarium* patch in turfgrass by 86 percent. The rates varied between 50 and 150 pounds of sulfur per acre. Fifty pounds of sulfur can be supplied with 300 pounds of potassium sulfate. This would also yield about 150 pounds of potassium oxide which usually is sufficient to balance 7 to 8 pounds of nitrogen to 1,000 sq. ft.

This property of controlling disease really should cause no great

(continued on page 60)

ROOF RANGER Self-Propelled . . . Built Rugged for Less Down-time

Tilt blade for heavy cutting, flatten for fine mowing. Equip with single caster for in-tight trimming; stationary front wheels for miles of mowing. (Optional riding cart). 24" cut, 5 h.p., or 26" cut, 7 h.p. Oil bath gear drive, blade clutch, cutting height adjustment, grass catcher extend usefulness and productivity. Roof Ranger self-propelled is the authority on hills, peaks, slopes, valleys.

ROOF "400" Pushes Easier, Lasts Longer

Sturdy Roof "400" can cut dense 18" growth; can mow lawns smooth. Fine balance, easy rolling rubber-tired steel spoke wheels, adjustable handles, easy cutting height adjustment. The ideal mower for **all** heavy-duty commercial-type mowing and trimming. Blade clutch for easier starting the 5 h.p. engine, choice of stationary or swivel caster front end, choice of 21" or 24" cut. Belt driven blade protects engine, simplifies maintenance.

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the WISER winter izer

Most effective winter protection at lowest cost, WILT PRUF Anti-Transpirant prevents excess water-loss caused by drying winter winds. You can eliminate burlap windscreens. WILT PRUF saves shrubs, trees and roses all year round . . . from winter kill, summer scald, drought and city air pollution. Combats transplanting shock and extends the safe transplant season, too. *Write on your letterhead for 50-page technical manual of applications.*

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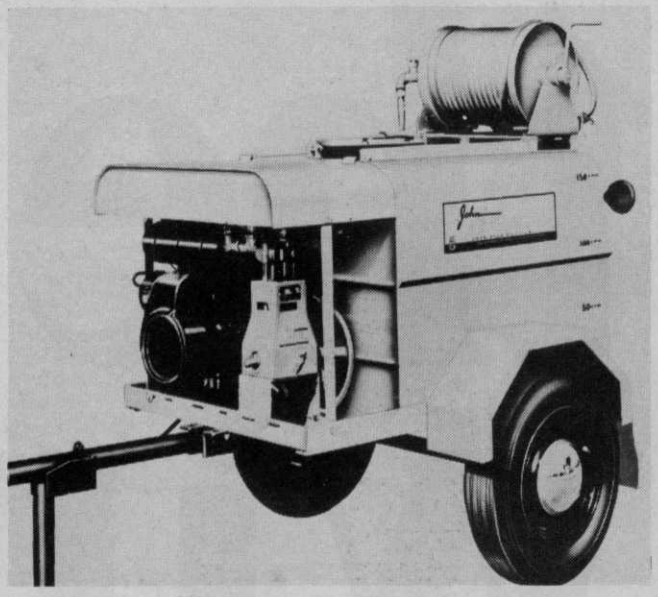
NS-7-67

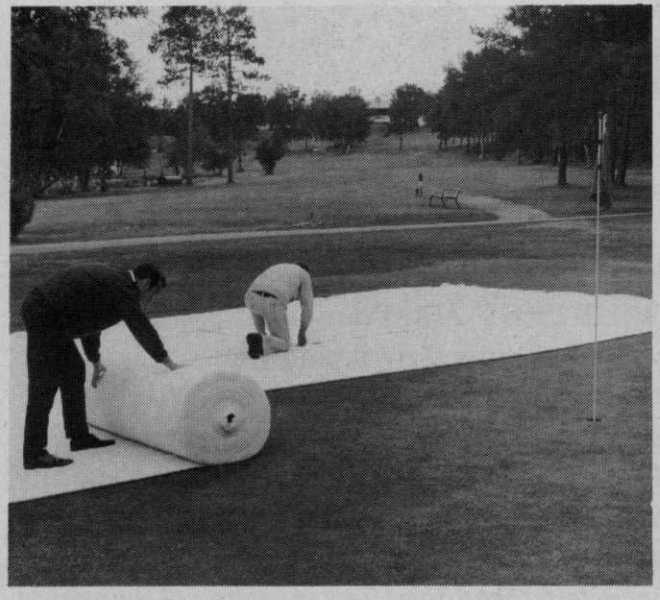
FRONT RUNNER GROUNDS MAINTENANCE TRACTOR: Hesston Corporation, Industrial Division, Hesston, Kans.

Front wheel hydrostatic drive and articulated center-hinge steering are two of many features of this new 18 hp, Model 180 Front Runner. A two-cylinder engine powers the tractor and drives the 60-inch front mounted mower. Turning radius is a short 27½ inches (inside) to permit mowing around small trees in one pass. Model 180 is equipped with a mechanical clutch, key starter, pedal-operated header lift, sealed and tapered bearing rear wheel hubs, and a three-bushel rear box with tailgate. For more details, circle (701) on the reply card.



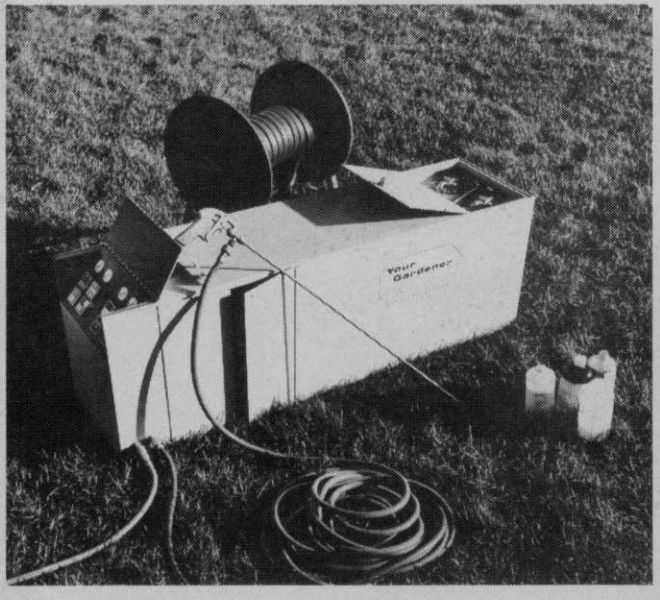
SELF-CONTAINED SPRAYER: John Bean Division, FMC Corporation, Lansing, Mich.

Ready-to-go high pressure sprayer complete with tail lights, turn indicators and mounted on a heavy duty axle is available from John Bean. Has 150 or 200 gallon steel, rust resistant lined tank, pump and engine compartment and cab top. Features a Royalette 10 gpm at 500 psi high pressure pump, 100 foot hose reel for ½-inch high pressure hose and adjustable stream Spraymiser hand gun. Can also be equipped with folding boom for turf care. Safety ball hitch and 20-inch ground clearance provide easy towing to any location. For more details, circle (702) on the reply card.



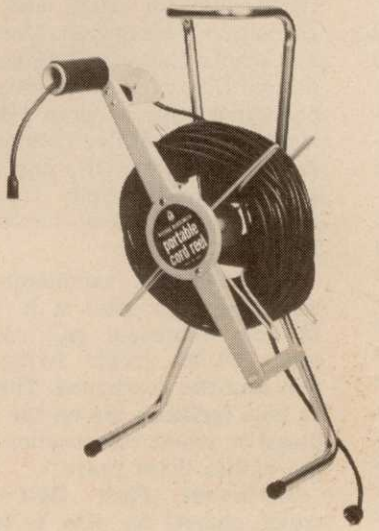
TURF PROTECTION BLANKET: Conwed Corporation, St. Paul, Minn.

Protect putting greens and tees from low temperature kill with a blanket that weighs only 18 pounds per 200 by 6 foot roll. It may be used on both cool and warm season turf. Recommended for areas with minimal snow accumulation, low amounts of precipitation, severe drying winds and wide temperature extremes. The blanket traps and retains soil moisture, reduces washing of snow mold fungicides, permits sufficient light penetration for rapid early spring green up, and leaves no debris upon removal. It can be used for 2-3 seasons depending on climatic conditions, installation and removal procedures. For more details, circle (703) on the reply card.



YOUR GARDENER-MARK II, The Guildsmen Company, Harrisburg, Pa.

Here is a self-contained, pneumatic-hydraulic unit that is compact and mobile. A custom applicator can use this new concept in spraying equipment for proportioning herbicides, insecticides, fungicides and fertilizers simultaneously to turfgrass and lawns. For more details, circle (704) on the reply card.

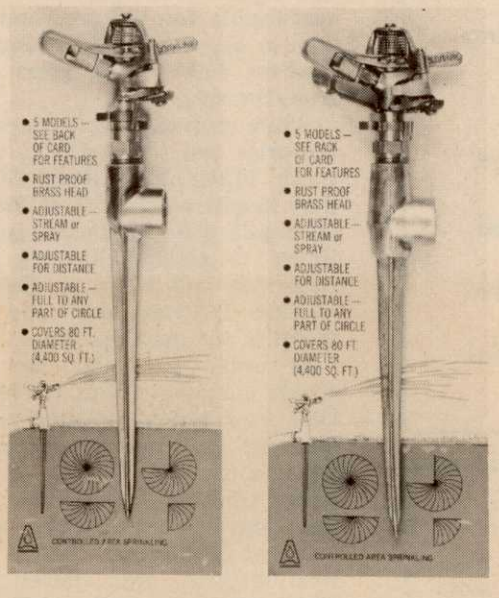


PORTABLE ELECTRIC CORD REEL: Village Blacksmith, Div. of McGraw-Edison Co., Watertown, Wisc.

Eliminate electric cord tangling, knotting and twisting with this portable cord reel. It holds 150 feet or more of electric cord and can be wound or unwound without unplugging. Made of heavy gauge steel and special cast aluminum alloy, the unit can stand alone or can be attached to wall or siding with two brackets mounted on the back. Also features a convenient handle for easy pick-up. Cord pulls through handle. For more details, circle (705) on the reply card.

ELECTRIC START-AUTOMATIC TRANSMISSION TRACTOR: Yard-Man, Jackson, Mich.

Model 3480 is the latest introduction in a growing line of Lawnbird garden tractors from Yard-Man. It features an 8 hp engine, electric start, 32-inch cutting width, "on-the-go" cutting height adjustment from 1-inch to 3¼-inch, and headlights. The tractor line stresses the modern look along with a variety of important safety and convenience features. Safety transmission interlocks which prevent the engine from starting except when in neutral are standard. Optional accessories are available for this model. For more details, circle (706) on the reply card.



IMPULSE SPRINKLER & STAKE: Aqua-Trol Corporation, Copiague, N.Y.

Made of solid bronze and brass on an aluminum stake, these impulse sprinklers cover a watering area of 80 feet diameter. They are adjustable to full or part of a circle and come complete with diffuser screw to adjust from stream to spray. The 9½ inch stake prevents sprinkler from working loose when in operation. The model on the right comes with a deflector shield to control the water trajectory. For more details, circle (707) on the reply card.

SCOOP-HOOP: Gordon A. MacEachern Ltd., Toronto, Ontario

Scoop-Hoop speeds the clearance of litter and waste from all areas. Combines a strong tubular aluminum frame with a rugged, lightweight collection bag made of woven, polyolefin fabric. Weighs less than a pound. Overall size is about 30 inches high and 16 inches wide. Reinforced aluminum lip is angled to speed litter into the collection bag. It's nicknamed the "pollution fighter." For more details, circle (708) on the reply card.

OUTLOOK *(from page 18)*

than elaborate facilities is favored and projects furnishing a broad range of outdoor recreation uses and experiences are preferred. Funds apportioned to the states under this program finance 50% of total allowable project costs on a matching basis.

This program became operational in 1965. Since its inception through 1971, $503 million were approved for 50% matching grants. Grants have helped to finance such diverse projects as multipurpose metropolitan parks, picnic areas, campgrounds, bicycling paths, swimming pools and golf courses.

Rogers C. B. Morton, Secretary of the Interior, has announced the distribution of $255 million appropriated by Congress for fiscal year 1972 grants to states and their cities and counties under the BOR Land and Water Conservation Fund program.

This year's appropriation provides the largest amount of money for grants to states in the history of the program. "With apportionment of these funds, we will have provided more than three quarters of a billion dollars in Federal funds," Secretary Morton said. "When mated with an equal amount of state and local money, this means an investment of over $1.5 billion for preservation of needed outdoor recreation areas and for development of facilities to service public needs."

In order to speed up action on requests for grants, regional offices of the Bureau of Outdoor Recreation may now review and approve grant-in-aid projects involving public parks, open space and recreation lands and waters. Regional offices are located in Philadelphia, Pa. (Northeast region); Atlanta, Ga. (Southeast); Ann Arbor, Mich. (Lake Central); Denver, Colo. (Mid-Continent); Seattle, Wash. (Pacific Northwest) and San Francisco, Calif. (Pacific Southwest).

During the decade ending in 1970, municipal golf courses increased in the nation by almost 48%. The Maryland National Capital Park and Planning Commission's municipal golf development program illustrates what is happening in many communities.

The Commission, which is largely responsible for parks and outdoor recreation facilities for Montgomery and Prince Georges Counties (Washington, D.C. suburbs), operated only one 9 hole golf course in 1960. Today it owns and operates 72 holes of golf (six courses—two 18's and four 9's) and plans to begin construction soon of a third 9 at its Northwest Park Golf Course.

Frank Rubini, commission director, says, "our goal is to have an 18 hole municipal golf course for every 30,000 people living in the two counties concerned. Three more 18 hole facilities are on the drawing board on which construction will begin within three years."

Northwest Park Golf Course, which opened for play in 1964, had 55,540 rounds played on its 18 hole layout during the fiscal year ending June 30, 1971. Needwood Golf Course, also 18 holes (opened in September 1969), had 55,763 rounds during the same period.

The Commission's four 9 hole golf course operations — Sligo, Paint Branch, Oxon Run and Hensen Creek —each served from 65,000 to 74,000 customers during the same fiscal year.

Sixty-two powered golf cars are maintained at each of the 18 hole operations. Golf professionals are responsible for the cars and either own or lease them. The Commission receives 10% of the gross income from the cars.

While municipal golf courses still comprise less than 15% of the nation's 10,400-plus golfing facilities, they handle about 45% of the country's golf play. Municipal golf continues to expand its role in the American golf scene as alert communities provide more and better facilities for their residents.

In order to better serve golf course planning groups, the National Golf Foundation recently reorganized its golf facility development services. Buddie Johnson of Livermore, Calif., is responsible for 7 west coast region states; George Kerr, of Richardson, Texas, has 10 west central area states; Larry Smith of the Chicago headquarters office is responsible for 7 north central states; Fred Stewart, Nashville, Tenn., serves 7 south central states; Harry Eckhoff will continue to cover the 17 states on the eastern seaboard from his Arlington, Va., office.

Facility development consultants are available to any golf course planning group for assistance with the development of needed golf courses in their respective areas.

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insect report

TURF INSECTS

FIRE ANT

(Solenopsis germinata)

TEXAS: Numerous infestations in Brazos, Robertson, Wilson, and Bee Counties.

CHINCH BUG

(Blissus leucopterus leucopterus)

ILLINOIS: Surveys indicate populations about 3 times heavier than 1970; still below economic levels.

PLANTHOPPER

(Delphacodes propinqua)

LOUISIANA: Heavy, adults 5,000 per 100 sweeps, on common and coastal Bermudagrass in central and northern areas.

SNAIL

(Rumina vecollata)

ALABAMA: Abundant in local area at Montgomery, Montgomery County, October 25, 1971. This is a new state record. Occurs in Texas and Mexico.

INSECTS OF ORNAMENTALS

CHINESE ROSE BEETLE

(Adoretus sinicus)

OREGON: Single live adult intercepted at Salem, Marion County; in suitcase. Apparently trapped in luggage in Hawaii.

PIERID MOTH

(Phoebis sennae)

ALABAMA: Larvae collected at Faunsdale, Marengo County, October 11, 1971. This is a new State record.

PALM LEAF SKELETONIZER

(Homaledra sabalella)

ALABAMA: Larvae ranged 2-10 per leaf skeletonizing palms on Dauphin Island in Mobile County April 16, 1971. This is a new state record.

TREE INSECTS

APHID

(Cinara pinivora)

MARYLAND: Specimens collected from *Pinus taeda* at Beltsville, Prince Georges County, on June 6, 1971. Determined by A. N. Tissat. This is a new state record.

SMALLER EUROPEAN ELM BARK BEETLE

(Scolytus multistriatus)

GEORGIA: Symptoms of Dutch elm disease noted June 10 in Clarke County, confirmed. Apparently widespread throughout county.

SOUTHERN PINE BEETLE

(Dendroctonus frontalis)

MISSISSIPPI: Indications of a buildup indicated in pine forests in southern areas. Populations increasing in size and number.

OLETHREUTID MOTH

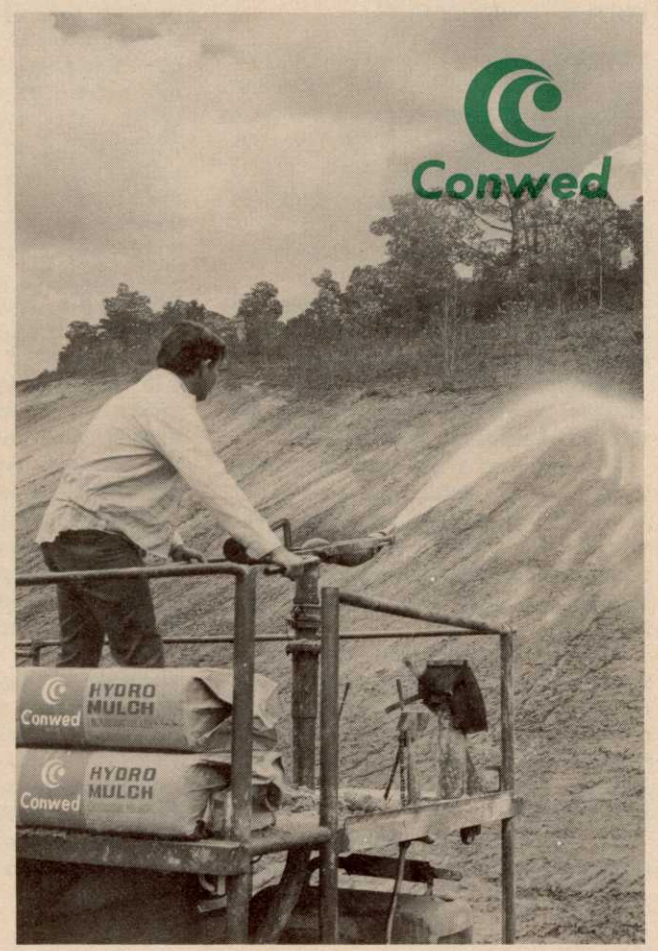
(Paralobesia liriodendrana)

ALABAMA: Larvae taken from tulip poplar trees at Shorter, Macon County, October 18, 1971. This is a new state record.

OLETHREUTID MOTH

(Rhyacionia bushnelli)

CALIFORNIA: Pupae occurring in tips of Monterey pine *(pinus radiata)* in nursery stock in Wasco, Kern County. This is a new county record. Pupae 40 and one larva taken from branch terminals from 2 Monterey pine at El Cajon, San Diego County. Damage severe and terminals brown. Unspecified hymenopterous parasites taken from pupal cases.



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For More Details Circle (113) on Reply Card

SULFUR *(from page 54)*

surprise because we have known this about sulfur for a long time. The surprising thing is that so many of us have forgotten it or have not put the knowledge to use.

Another turfgrass disease that has been checked and controlled to a large degree with sulfur is *Ophiobolus* patch.

When Merion Kentucky bluegrass is short of sulfur, it is much more susceptible to powdery mildew.

Dollarspot fungus in warm-season grasses in Florida was reduced by the use of sulfur in fertilizers.

This may be a bit hard for many to believe, but data from the Pacific N.W. show that adequate sulfur prevented *Poa annua* from infesting bentgrass turf. At the same time the blue-green algae was reduced significantly.

Perhaps some of the advantages found in using adequate sulfur come from the fact that turf is rendered more vigorous, an obvious sign of healthier grass. Healthy turf resists injuries and recovers faster when injury occurs.

Dr. J. D. Beaton, director of agricultural research for the Sulphur Institute in Washington, D. C., has accomplished a thorough review of the literature wherein there is an interaction between turfgrass and sulfur. We have previously named some of the advantages of keeping sulfur in balance with nitrogen, phosphorus and potash. But a statement of Dr. Beaton's seems particularly appropriate. "Sulfur deficiencies retard the growth of plants, including turfgrass," noted Beaton.

Merion bluegrass grown in sand culture showed a sulfur content of 0.15 percent in the leaves when grown in a complete nutrient culture. It rated only 0.04 percent when the solution was deficient in sulfur. Deficient leaves were yellow.

"Nitrogen and sulphur requirements are closely linked because both are required for protein synthesis," continued Dr. Beaton. "Plant protein contains about 17 percent nitrogen and 1 percent sulfur. Fertilization at high rates, particularly with nitrogen, will greatly increase the need for sulfur and may induce a serious sulfur deficiency."

From data submitted it was evident that a deficiency of sulfur restricted the crop response to nitrogen fertilization. Also, crop response to sulfur occurred only when nitrogen was applied. Maximum response to nitrogen occurred only when sulfur was applied. Turfgrass managers should find it difficult to ignore these signals.

Sulfur deficiency symptoms in grass can be confused with those of nitrogen, iron, and potash shortages so that visual detection may be unreliable. Here is one case where tissue (plant) anlaysis can be most helpful. Specific data on the influence of sulfur on turfgrasses are limited, but all the evidence points in one direction—that sulfur plays an important role in turfgrass management.

Goss reports that turfgrass growth appears to be improved with sulfur on soils that are deficient in phosphorus. This is of great importance to those managers who have succeeded in creating a phosphorus deficiency in their efforts to reduce infestations of annual bluegrass.

Under wet cool conditions in the spring turfgrasses in some areas (for example, western Washington) develop a yellowish mottled appearance which can be reduced or eliminated with sulfur fertilization.

(Continued on page 64)

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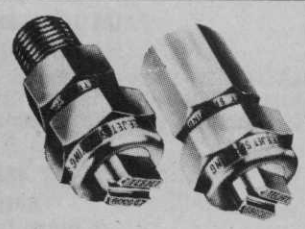

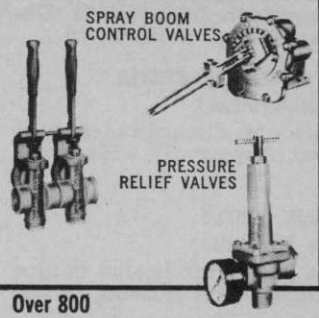

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For More Details Circle (141) on Reply Card

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For More Details Circle (118) on Reply Card

grass golf greens, more than a million square feet of bentgrass, which is highly susceptible to the frit fly. This blade-chewing pest, says Judd, "is a pistol of a problem from mid-May to September.

"Frit fly problems develop when daytime and nighttime temperatures remain high," he says. "The frit fly will discolor the turf. It starts on the tips of the grass and works its way down. It can do great damage if it gets to the crown of the grass. It's imperative that we control it."

Like Muir, this golf maintenance supervisor turned to modern methods of insect control. "We sprayed Diazinon AG500 early last summer," he recalls. "We sprayed, waited 11 days, then made a second application." Total number of applications needed was about three or four. Judd has found the material to be compatible with most fungicides, herbicides and other insecticides.

The non-persistence of an insecticide is important to Robert L. Scofield, general manager of Environmental Care, a landscape maintenance firm based in Santa Ana.

Among Scofield's clients is Lakeshore at Westlake Village, a major development northwest of Los Angeles. Concern for the environment is important here. Residents expect good insect control, but they don't want residues to build up. Scofield studied many insecticides available for commercial use before selecting Diazinon. This product did not persist and would not harm the village's lake.

Scofield recalls other customers with insect problems who have been pleased with his control programs. One in particular was a large retirement community in Orange county with a skipper butterfly infestation on a new $15,000 bowling green.

Robert L. Scofield, general manager of the Environmental Care turf maintenance firm of Santa Ana, Calif., explains how treatment with Diazinon saved this $15,000 bowling green from a skipper butterfly infestation at a California retirement center.

This 120,000 square-foot green was seeded in Seaside bentgrass late last summer. The skipper infestation began during a subsequent heat wave.

"We made broadcast applications of 14G," says Scofield. "The turf was so young we didn't want to get on it with sprayers, so we used granules. We got real quick control."

Turfgrass problems are different in cooler Northern California where the frit fly is seldom seen, but insect control is important there, too.

Cutworms and lawnmoths were controlled with Diazinon last summer at San Francisco's Sequoyah Country Club by course superintendent Gurmit S. Sandhu.

Sandhu makes applications after aeration and top-dressing—a troublesome time because insects get down into the new holes to lay eggs.

This aeration problem is further echoed by Rich Eichner, superintendent at the plush Lakeside Golf Course in North Hollywood. His course is one of the few Southern California links which has avoided costly frit fly problems. Eichner credits his success to timely applications of Diazinon 50W, a wettable power.

Throughout California, where turfgrass plays an important part in an "outdoor culture," the trend in insect control is to compounds that offer effectiveness and safety without residues. Organic phosphates such as Diazinon are doing the job.

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trimmings

FLAMMABLE FABRICS ACT also applies to artificial turf or grass, according to Secretary of Commerce, Maurice Stans. The Federal Trade Commission has ruled that the Standard for the Surface Flammability of Carpets and Rugs means artificial turf, too. But in making the decision the FTC said that if any producer can provide information about a product line to disqualify it from the flammability standards, he can petition for a determination.

MUD RATES FIRST in serious football injuries. Second is artificial turf followed by turfgrass. That's the report the medical committee told the NCAA. Dr. Samuel I. Fuenning, chairman of the committee, said it doesn't make any difference if football games are played on grass or artificial turf — players are still going to get hurt. The committee compiled injuries per game from 40 colleges and universities during the 1970 season. Results were 2.86 injuries per game on synthetic turf and 2.67 on turfgrass. More serious injuries occurred on mud than any other surface.

PARK & TURF DEGREE is now offered by the University of Nevada. It is a two year program designed to give the student a broad background in park and turf management. Specific professional courses are offered as well as on-the-job training during the summer after the first year.

"PESTICIDE TECHNOLOGY is complex and requires a multi-disciplined scientific, engineering and business effort. It is difficult for people who are **directly** involved, let alone those on the outside, to comprehend the total picture." A strong and extremely accurate statement by Kenneth L. Schulz, director of the Regulatory Division of Velsicol, in a speech before the American Public Health Association. Schulz also pointed out that the effort to develop biological or non-chemical means of pest control so far has produced little in the way of practical results for commercial use.

SULFUR *(from page 60)*

When comparisons of nitrogen carriers were made on fescue, bent, and bluegrass turf at the University of British Columbia (200 lbs. of N per acre or 4½ lbs. per 1,000 sq. ft.), it was found that the ammonium sulfate increased turf density, created deeper green color, and lengthened the duration of response. The other carriers (no sulfur) were urea and ammonium nitrate. Response to nitrogen was poor.

Beaton has discussed several materials as sulfur carriers but none seem to be as adaptable to turfgrass management as potassium sulfate. The proportions of potassium to sulfur appear to be almost perfectly balanced when considering any level of nitrogen fertilization. True, not every soil under every turfgrass area will be sulfur deficient; but, as the use of nitrogen continues, we can expect to see a response to sulfur sooner or later.

Beaton has drawn on some 50 references for his exhaustive review of the role of sulfur in turfgrass fertilization. It leads this writer to sound the warning to every turfgrass manager. Look for possible need of sulfur on your turfgrass.

Army Engineers Test Underwater Tree Survival

Army engineers are testing survival of trees which must spend at least a part of the year standing in water.

Native trees, shrubs and grasses have been planted in an area where high and low water levels exist.

Purpose of the trials, by the U.S. Army Corp of Engineers, is to find vegetation which will survive near lake edges and similar areas, and thereby eliminate the bathtub ring effect of flood control lakes during low water periods. The vegetation would also offer more sanctuary for wildlife.

Trees and shrubs were planted in mid-December near Stockton, Calif. More than 1200 one and two year seedlings of eight varieties were used. These were specially located to provide for differences in soil, water depth, exposure, and wind.

Late next spring, the Army group will also broadcast seeds of a greater variety of trees and shrubs as well as selected grasses within the test plots.

A Case To Ponder

The fabled story about killing the goose that laid the golden egg has applications in today's modern business. It seems that before Champion Forge closed down, the union shop committee insisted that workers could produce no more than four forgings an hour. Management time studies indicated that ten should be made. The union held output to four an hour. A **piecework rate** on four an hour was established. Production then jumped to 16 an hour.

Now, no one has a job there.

"We used to make I-beam truck axles in our Cleveland plant, said Charles H. Smith Jr., Chairman, Sifco Industries Inc. in relating the above story to Walter J. Campbell, editor of INDUSTRY WEEK.

"Recently, we learned our former customer was planning to buy axles in Japan or Spain. We decided we would try to get the business for our plant in Brazil.

"Today, we are making those axles there for delivery to the U.S. We found we could buy the steel in Japan, ship it 12,000 miles to Brazil, unload and haul it 100 miles inland to our plant, produce the axles, pack for export, ship them 6,000 miles to the U.S., pay 10% duty, plus 10% import surcharge since Aug. 15, pay inland freight in the U.S., and deliver them to the customer cheaper than we could make them in Cleveland, 5 miles from our steel source. Actually, we now are using Brazilian steel because the mills there met the Japanese price."

Now there's a merry-go-round case of labor's influence on the market!

For More Details on Following Page Circle (122) on Reply Card

OUR GANG.

A unique mowing tractor, designed to give more cutting capacity to one man and one machine.

The Parkmaster® with its 9 hand adjustable Spartan† mowers has an 18′ 6″ cutting width. Mows up to 12 acres an hour, saving time and manpower. Cuts mowing costs up to 50%.

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The Parkmaster folds up into an 8 foot width and transports at speeds up to 50 mph. It's also available in 5 and 7 gang models.

Check into Our Gang. The Parkmaster 9 from Toro.

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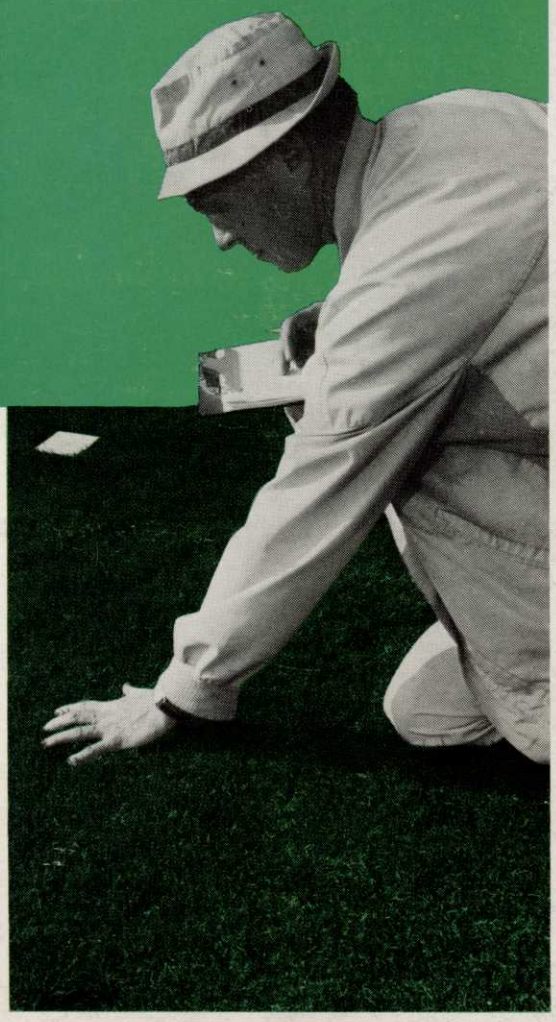

Today, when knowledgeable agronomists talk about The Greening of America, they're talking about Baron Kentucky Bluegrass—discovered in Holland by the renowned plant breeder and seedsman, Barenbrug of Arnhem, The Netherlands, and now grown in America exclusively by Lofts Pedigreed Seed, Inc.

Baron Bluegrass germinates rapidly, grows slowly, and is adapted to mowing as low as ¾" . . . making it ideal for golf courses, fine lawns, and industrial properties. Its broad blades interlock to make a crisp surface ideal for holding a golf ball on the fairway.

Baron Bluegrass is extremely winter hardy, maintains a fine winter color, and is highly disease resistant. It is a vigorous variety, the seed sprouting quickly, the rhizomes knitting a strong sod rapidly.

All Baron seed is CERTIFIED BLUE TAG, poa annua and bentgrass free.

Other varieties of grasses currently available from Lofts include Jamestown Red Fescue, Exeter Colonial Bentgrass and Kingstown Velvet Bent.

GOLF COURSE BUILDERS OF AMERICA
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Dr. Kenyon T. Payne, Professor of Crop and Soil Sciences at Michigan State University, states: "Baron has been an outstanding variety. It maintains excellent dark green color throughout the season. During an exceptionally severe **Helminthosporium** leafspot infestation in 1970, it ranked second in seasonal appearance of all named bluegrass varieties which are commercially available, and first in this group in resistance to **Typhula** snowmold. It appears to be highly promising for the sod and turf industry." Dr. Payne heads the M.S.U. Turfgrass Breeding Research projects and is currently working on fine-leaf fescue breeding and seed production programs for Wintergreen Chewings Fescue and a new winter-hardy Meadow Fescue.

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